DOCUMENT RESUME

ED 393 756 SO 026 113

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TITLE Relationships between Postsecondary Students' Instrumental Performance Fundamentals and Musical Independence: How Important are Tone, Intonation, Phrasing, Ensemble, Technique, Dynamics, Rhythm, History, Form, and Theory?
PUB DATE 94
NOTE 36p.; Paper prsented at the Mid-West International Band & Orchestra Clinic of the National Band Association (Chicago, IL, December 14, 1994). For related study papers, see SO 026 112 and 114.
PUB TYPE Speeches/Conference Papers (150) -- Reports - Evaluative/Feasibility (142) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Bands (Music); Fine Arts; Higher Education; *Music; *Music Activities; *Music Education; *Musicians; Secondary Education; *Student Characteristics; Student Experience; Student Surveys

ABSTRACT

This study examines the relationships among a variety of secondary/postsecondary experiences and activities and postsecondary students' musical independence (MI). The paper reports on the impact of 10 Performance Fundamentals (PFs) on the postsecondary student's MI as measured by Colwell's Musical Achievement Test 3 (MAT3) and Musical Achievement Test 4 (MAT4). The study also explores whether these skills have a positive impact on the student's level of MI and examines the percentage of impact the skills have either individually or collectively on the students' level of MI. The Instrumental College Survey-2 (ICS-2), Colwell's Music Achievement Test 3 (MAT3), and Colwell's Music Achievement Test 4 (MAT4) were administered to 354 instrumentalists in the bands at Ball State University, Florida State University, and Wichita State University. The instruments examined two general areas: general demographic data and student outcomes. The study concluded that: (1) phrasing and intonation are two of the primary "artistic" cornerstones in the student's MI development; (2) not every college musical activity or experience is a positive or edifying experience for music majors; (3) there is a very strong link between what is taught by the private teacher and what a student practices; and (4) the selection and use of statistical analysis has a large impact on the study's findings and conclusions. Extensive charts and graphs accompany the text. (EH)

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ED 393 756

RELATIONSHIPS BETWEEN POSTSECONDARY STUDENTS' INSTRUMENTAL PERFORMANCE FUNDAMENTALS AND MUSICAL INDEPENDENCE:

How Important are Tone, Intonation, Phrasing, Ensemble, Technique, Dynamics, Rhythm, History, Form, and Theory?

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1994 National Band Association (NBA)
Mid-West International Band & Orchestra Clinic
Chicago, IL
December 14, 1994

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RELATIONSHIPS BETWEEN POSTSECONDARY STUDENTS' INSTRUMENTAL PERFORMANCE FUNDAMENTALS AND MUSICAL INDEPENDENCE:
How Important are Tone, Intonation, Phrasing, Ensemble, Technique, Dynamics, Rhythm, History, Form, and Theory? [1]

I. INTRODUCTION

A musician's artistry and musicianship is the sum of musical fundamentals, skills, concepts, and knowledge. What are the essential performance fundamentals associated with artistry and musicianship? Do each of these fundamentals play an equal role in developing artistry, or are some more important than others? Are some performance fundamentals more basic to musicianship and artistry than others? If the answer is yes, then these may be some overall hierarchy associated with the development of musicianship.

While music educators have identified many important concepts and skills associated with musicianship and artistry, a universal taxonomy of definitions and concepts has not been adopted. With the current national movements toward educational assessment and accountability, music education would be well served by the development of a hierarchical set of descriptors and criteria. Other disciplines, such as science and mathematics, have adopted definitions and hierarchies that are quantifiable, and thus more easily understood by those outside the discipline.

Assessment is not new to music education. Competent musicians and music educators continually assess the understanding and application of musical fundamentals, skills, concepts, and knowledge on a second-to-second basis. This moment-to-moment assessment is the very basis of every lesson, every rehearsal, and every practice session. Hovey (1976, p. 82) recognizes the importance of identifying performance fundamentals and how they relate to the development of musicianship:

> . . . Those whose achievements have been most noteworthy have worked hard and have been slow to admit that any obstacle is insurmountable. There have been numerous cycles of changing philosophy and methodology, but there has always been a return to the most basic of all precepts--to teach fundamentals as the most positive means to ultimate goals.
>
> And if you frequently call attention to proper relationships of the various parts of compositional structure, band members will become increasingly adept at evaluating their own parts as they fit together with other parts.
>
> For many reasons, foremost among which is the public appearance schedule, strict adherence to a week by week course of study in instrumental music is practically

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[1] This paper (using the same title) was presented at the 1994 annual meeting of the 1994 *Mid-South Education Research Association.* It is one in a series of papers that examines the relationships among a variety of secondary/postsecondary experiences and activities and the postsecondary student's musical independence. The authors have presented other research (i.e., using other aspects of the Florida State, Ball State, and Wichita State data) to educational conferences including: *Mid-South Education Research Association* (1992, 1993, & 1994); *National Band Association* (1992, 1993, & 1994); and the *American Educational Research Association* (1994 & 1995).

impossible. But it is advisable to set up some long range plan which will contribute to continuing progress. The plan could include such items as common terms, rhythmic figures, key signatures and meter signatures, all essential to **students' musical growth**. (emphasis added)

What are the fundamental skills associated with artistry? In the discussion below, Hovey (1976), identifies important performance fundamentals, but does not clearly define or prioritize them.

> . . . But in all situations the rehearsal objective is the same: to improve the existing level of musical knowledge and performing skills of the organization. This objective can be subdivided into what might be called the **fundamentals** of effective **ensemble** performance, namely: **intonation**, **tone** quality, **rhythm**, articulation, tempo, **phrasing**, **dynamics** and balance.
>
> The ideal rehearsal will concentrate heavily on **ensemble** rather than individual problems. It will probably be found that some section work is essential at times, but fitting prepared parts together correctly is the primary function of the rehearsal. This indicates that some individual preparation (*i.e., individual practicing*) should be expected and required .
>
> When a conductor corrects a wrong note he is solving a short-range problem. When he works to improve intonation he is attacking a long-range problem (i.e., implies the importance of musical independence) (emphasis added).

In the above citation, Hovey implies the direct linkage between "ensemble" and "performance". The Harvard Dictionary of Music (Apel, 1969, p. 294) defines the term "Ensemble": "Ensemble refers to the balance and unification attained in performance." Ensemble then, when connected to the actual performance, should be one of the cornerstones of a musical performance and therefore directly linked to the student's MI. Hovey further recognizes that the final objective of music instruction is independence from supervision when he speaks of "individual preparation." Reynolds (1993) also endorses the importance of musical independence:

> "Build Player Independence:" Our purpose here is to make ourselves dispensable as teachers. We should be beginning the process of helping students to become independent musicians at the elementary level and then carry it right on through. We know that in the really wonderful groups in this world, much of the work is done by players listening to each other. However, in most bands, the players feel a need to play to the conductor, who controls every aspect, often with an "iron hand." We conductors are certainly essential—guiding the rehearsals and directing the interpretation--but the ultimate precision, pitch and so many of these kinds of things are really achieved by players (*i.e., the notion of independence*) (emphasis added).

In the real world of instrumental performance, instrumental students and ensembles' are evaluated or judged by musical experts. The North Dakota High School Activities Association (1993) uses an adjudication sheet that identifies 10 general areas of performance fundamentals including: (1) quality of selection, (2) dynamics, (3) blend, balance, (4) intonation, (5) tone quality, (6) rhythm, (7) tempo, (8) style, interpretation, (9) articulation, technique, and (10) musical effect (i.e., a phrase implying

general artistry). The judges rate each of the 10 performance fundamentals and then rate the band performance as: STAR (superior performance), HONORABLE MENTION (commendable performance), or SATISFACTORY. All 10 performance fundamentals are weighed equally. There is no attempt to prioritize the criteria.

In Tennessee, the Smoky Mountain Music Festival (1987) "Concert Band Adjudication" sheet identifies similar performance fundamentals, but goes a step farther by assigning different weight to the criteria: (1) Tone (20 points), (2) Intonation (20 points), (3) Balance (20 points), (4) Technique (15 points), (5) Interpretation (15 points), (6) Choice of Music (10 points). Both adjudication sheets are similar, as they require judges to evaluate instrumental students on recognizable and identifiable performance fundamentals.

The musical term "Form" encompasses all of the structure of a musical work, including its realization in performance. Able (1969, p. 327) writes: "Form in music includes practically all the theoretical and compositional principles of music." Form describes more than the musical organization of the composition. In a broader sense, Form references the dynamic, rhythmic, historical, and the theory aspects of a musical composition. Form influences many artistic performance considerations regarding the performer's tone, technique, phrasing, and ensemble.

Bollinger (1979, p. 94) states: "Most of the principles of good musicianship are developed and refined over a period of years through lesson materials presented in . . . individual lessons. Student intonation, however, must be learned in group situation. Tone, intonation, technique, and rhythm can be taught in a full band, even though less effectively than through small group training". Middleton (1986, p. 46) identifies many of the same PFs: "Tone, intonation, precision, blend and balance, dynamics, style, and musicianship are recognized as areas to be addressed when planning both short and long-range goals". Again, there is no attempt to prioritize the PFs.

II. BACKGROUND

Historically, the authors of the research project have used the notion of musical independence (MI) as the key indicator of student outcome in music (see references). For example, in the area of instrumental performance, a beginner requires constant instruction, a college student requires some but not constant instruction, and a professional performer requires little instruction: the beginner would be musically dependent on the teacher, the college student would be moderately musically independent, and the professional would be musically independent. The authors of this paper make a subtle difference between musical independence (MI) and musical achievement. Musical achievement represents the mastery of any academic skill related to music, but MI is directly related to the actual production and performance of music. The link between knowledge acquisition and the application and use of that knowledge in performance is the key: music knowledge may exist without MI, but MI may not exist without music knowledge.

In the authors' secondary MI research (i.e., 9th or 10th grade through 12th grade), the findings indicated identifiable and measurable differences between average (randomly selected) and outstanding (nominated) instrumental music programs (Bobbett, 1987a and b). Other research examined students and band directors participating in "good" Appalachian high school instrumental programs. The student portion of the project noted a positive relationship between high school music activities such as marching contests, concert festival, solo-ensemble, solos, other ensembles, etc., and the student's MI (Bobbett, 1991a). The band director segment examined the grading procedures that influence a student's musicianship and the relationships that exist between demographic data and band directors' and students' MI (Bobbett, and Bobbett, 1990b).

Student's MI and high school activities that impacted MI were studied from the post-secondary perspective as well. When the students participating in the University of Tennessee band were evaluated (Bobbett, 1989, 1990a), the findings indicated that participation in all-state band, solo-ensemble, concert festival, private lessons, and church/community choir had a positive impact on the student's MI. Researchers expanded the early post-secondary research and examined the students participating in the three instrumental ensembles at Ball State University (Bobbett, 1991b, 1992). The findings suggested positive links between high school activities such as all-state band, concert festival, solo-ensemble, private lessons, and student/program MI. Next, the authors examined the high school music activities in which instrumental students at Ball State University, Florida State University, and Wichita State University participated. Many activities such as high school private lessons and all-state band had a positive impact on the student's MI. Music activities that did not have a positive impact included all-state orchestra, all-state jazz band, all-state choir, concert festival, marching contests, church/community choir, and high school jazz band (Bobbett, 1993).

III. PURPOSE

One purpose of this study is to examine the impact 10 Performance Fundamentals (PFs) have on the postsecondary student's MI as measured by Colwell's Musical Achievement Test 3 (MAT3) and Musical Achievement Test 4 (MAT4). The second purpose is to examine whether these skills all have a positive impact on the student's level of MI. The third purpose is to examine the percentage of impact the skills have either individually or collectively on the students' level of MI.

IV. TESTS AND QUESTIONNAIRES

The Instrumental College Survey-2 (ICS-2) (see Appendix A), Colwell's Music Achievement Test 3 (MAT3), and Colwell's Music Achievement Test 4 (MAT4) were administered to 354 instrumentalists participating in Ball State University, Florida State University, and Wichita State University bands. The instruments examined two general areas: general demographic data and student outcome.

A. Instrumental College Survey-2

This study focused on the Musicianship Section of the ICS-2 (see Appendix A, page 2). This section of the survey identifies the following ten Performance Fundamentals:

1. Tone (TO)
2. Intonation (IN)
3. Phrasing (PH)
4. Ensemble (EN)
5. Technique (TE)
6. Dynamics (DY)
7. Rhythm (RH)
8. History (HI)
9. Form (FO)
10. Theory (TH)

The students were asked to state the percentage of time they spent practicing/thinking about these ten skills during: (1) individual practicing, (2) band rehearsal, and (3) private lessons. Using a 5-point Likert-type scale, the students were asked to rate the importance of each skill in developing their instrumental musicianship, with "1" being not important and "5" being very important.

B. Musical Independence (MI)

The researchers used Colwell's (1970) Music Achievement Test 3 (MAT3) and Music Achievement Test 4 (MAT4) to evaluate the musical independence (MI) of instrumental students participating in the top, middle, and bottom bands at Ball State University, Florida State University, and Wichita State University. MAT3 was selected because the standardization information provided in the Interpretive Manual and the Administrative and Scoring Manual is adequate and the answer sheets are clear, self-explanatory, and easy to grade. Further, MAT3 best evaluates the student's musical independence (Bobbett, 1987) and has previously determined reliability estimates. Colwell's MAT4 was selected because it addresses, more directly, some of the concepts of music history and music theory generally covered in the undergraduate music curriculum. Colwell (1970) used the Kuder Richardson 21 (KR21) to evaluate the internal consistency of MAT3 and MAT4 for grades 9-12. The KR 21 ranged from .87 to .89 for MAT3 and from .84 to .89 for MAT4. The MAT 3 consists of four subtests:

1. Tonal Memory (MAT3, subtest #1 [3ST1]): (20 items) A chord is played on a piano first in block form, and then arpeggiated. The subject determines which tone of the arpeggiated version (four tones) changed. If the two chords are identical, the subject fills in the blank marked "O." Colwell defines this as "the ability to retain the quality of a chord" (p. 100).

2. Melody Recognition (3ST2): (20 items) A melody is first played on a piano and then it is placed in a three-part setting. The subject determines whether the original melody is in the high (H), middle (M), or lower (L) voice. If the subject is in doubt or fails to hear the melody, he fills in the blank marked "?" Colwell defines this as "the ability to follow a melody aurally" (p. 102).

3. Pitch Recognition (3ST3): (20 items) The subject hears the first tone of two written pitches, and afterward hears three additional pitches. The subject indicates which of the three pitches matches the second written pitch. Colwell defines this as "the ability to mentally hear the pitches seen on a page of music" (p. 104).

4. Instrument Recognition (3ST4): (15 items)
Subtest A: (10 items) After listening to a melody played on a particular instrument, the subject identifies, from the four possible choices, the correct instrument. If the four instrument choices do not match the instrument heard, the subject fills in the blank marked "O." Colwell defines this as "the ability to identify solo instruments . . . from an aural example" (p. 106-7).

Subtest B: (5 items) After listening to a melody played on a particular instrument within an orchestra setting, the subject identifies from the four possible choices the correct instrument. If the four instrument choices do not match the instrument heard, the subject fills in the blank marked "O." Colwell defines this as "the ability to identify . . . accompanied instruments from an aural example" (p. 106-7).

The MAT4[2] consists of "five" subtests:

1. Musical Style: (40 items)
Subtest A: Composer (4ST1): (20 items) After listening to a short orchestral excerpt, the subject selects from four choices the composer whose style most closely resembles that of the musical excerpt. Colwell defines this as "the ability to categorize music as to genre and style" (p. 166).

Subtest B: Texture (4ST2): (20 items) After listening to a short musical composition played on a piano, the subject marks the blank "M" for monophonic, "H" for homophonic, "P" for polyphonic, or "?" to indicate if she is in doubt. Colwell defines this as "the ability to categorize music as to genre and style" (p. 166).

2. Auditory-Visual Discrimination (4ST3): (14 items) After listening and viewing a four-measure melody, the subject fills in a blank below every measure in which the notation is rhythmically different from the melody he hears. If all the measures are correct, he fills in the blank marked "O". Colwell defines this as "the ability to accurately read rhythmic notation" (p. 169-170).

3. Chord Recognition (4ST4): (15 items) A block chord is played on the piano, and afterwards, three trial chords are played. The subject identifies from the three trial chords the one which sounds like the first chord. If none of the three chords are like the first chord, then she fills in the blank marked "O". If in doubt, she fills in the blank marked "?". Colwell defines this as "the ability to recall the sound of a chord, either by listening for its general harmonic characteristics, by recognition of the chord as an entity, or by mentally singing the pitches of the chord" (p. 170-71).

4. Cadence Recognition (4ST5): (15 items) After listening to a short musical phrase played on a piano, the subject identifies the cadence by filling in the blank "F" for full cadence, "H" for half cadence, and "D" for deceptive cadence. If the subject is in doubt, he fills in the blank marked question "?". Colwell defines this as "the ability to distinguish among three common kinds of cadence (full, half, deceptive)" (p. 173-174).

V. METHODOLOGY

The researchers assumed that music majors had more urgency in developing musical skills during college than did non-music majors. Perhaps realizing the strong possibility of becoming professional music educators or performers, music majors might have participated in high school music activities that were directly linked to the development of MI. Non-music majors might have participated in music activities for reasons other than MI development. Realizing that the comparison between music majors and non-music majors might provide additional

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2. For this study plus other related studies, Colwell's MAT4 subtest 4 (Chord Recognition) was re-organized into two subtests that are reported as MAT4 ST3 and MAT4 ST4.

insights regarding the evaluation of student outcome, the authors plan to report this analysis in a future report. Non-music majors (n=78) were eliminated from the total participant population (n=354), leaving the music major (n=276) data for the rest of the study.

This is not a longitudinal study: the instrumental postsecondary students were evaluated only once during the spring of 1991. To provide a fuller portrayal of the study's inter-related issues, inferential statistics were used. By using inferential statistics, the researchers realized that several assumptions were not strictly adheared to including: (a) students were not randomly assigned to the groups, and (b) the variance for each group were not equal (i.e., homogeneity of variance assumption) (Nunnally, 1978, pp 24-34). Therefore, instead of using randomly selected samples, the researchers used the total population of participants.

This is an exploratory study. Different statistical analyses were used to examine the data from a variety of perspectives. Therefore, once an item was identified as having some level of impact on student outcome (MI), additional statistical analysis is used to compare the first analysis with the observations noted in the other statistical analysis. Although a variety of statistical analyses were performed in the study's data and reported in total in the Appendices of this report, a large portion of the findings are not discussed in the paper. Hopefully, using the study's data analysis, other music educators can make additional observations that are not reported in this paper. (NOTE: The study's PFS items are coded. For example, "E2 TO" means this item comes from question 2 of Section E of the ICS-2, with "TO" being the acronym for tone.

The 4 questions posited in this study include:

1. What generalities can be observed when descriptive analysis is used to examine the study's 46 items?
2. What Performance Fundamentals (PFS) have an important impact on student MI?
3. What percentage of impact do each of the important PFS have on the student's MI development?
4. Does the selection of a statistical treatment impact the study's findings and conclusions?

Responding to question 1, descriptive analysis was used to examine the student's 10 Performance Fundamentals from four perspectives: (1) individual practicing, (2) band rehearsal, (3) private lessons, and (4) student's rating of each PFS in developing MI. The descriptive analysis included: number of responses, mean scores (M), standard deviation (SD), and minimum, maximum, and range. The kurtosis and skewness were used to examine the normal distribution for each of the study's items.

Next, each of the 276 music majors' grand total MAT scores were converted to **z-scores** and organized into five outcome groups:

High (n=48): z-score greater than +1.0
Medium High (n=92): z-score = .99 to .30
Average (n=63): z-score = .29 to - .29
Medium Low (n=46): z-score = -.30 to -.99
Low (N=27): z-score less than or equal to -1.0.

Means were developed for each outcome group for each of the 40 PFS items, and ranks were assigned for both the High and Low outcome groups. The Brown-Forsythe (BF), Welch ANOVA (WA), and the One-Way ANOVA (OW) were used to compare the scores for the five outcome groups. Next, the Scheffe was used to identify differences by outcome group, and the Permutation statistic was used to examine the trend-line between the five outcome groups. Finally, the Pearson Product Moment correlation was used to examine the positive or negative relationship between the study's 40 PFS and the student's MI score.

Regarding question 2, three types of regression were used to examine the relationship between each of the 40 PFS's (independent variables) and the student's MI score (dependent variable): Simple Regression, Stepwise Regression, and Exploratory Multiple Regression. The objective was to identify variables that are statistically significantly using a variety of statistical treatments. The rationale is that important variables—variables with a significant impact on the student's MI score—would be consistently identified among different statistical treatments, while less important variables would not surface consistently among the three types of regression. After examining the earlier preliminary data analysis, the authors hypothesized that since multicollinearity might have a substantially large impact on the study's findings and conclusions, a variety of regression models could be an appropriate statistical strategy to eliminate the overlap between the different independent variables.

To answer question 3, Guttman's Partial Correlation (GPC) statistic was used to examine the impact each of the 40 PFS items had on the student's MI.

Addressing question 4, a summary analysis of all of the study's statistical treatments was developed and discussed. The summary analysis includes: examining the responses of what the top MI students value most and least, permutation (trend-line) by outcome group, Pearson Product Moment correlation, three ANOVA models, three regression models, and Guttman's Partial Correlation statistic—a total of 10 different types of analyses.

VI. FINDINGS

1. What generalities can be observed when exploratory preliminary analysis is used to examine the study's 40 Performance Fundamentals?

A. Descriptive analysis

Music majors emphasized tone (M=19%), technique (M=18%), and rhythm (M=14%) the most during practicing while de-emphasizing history (M=2%), theory (M=4%), form (M=4%), and ensemble

(M=5%) (see Appendix B). The skills with the highest maximum percentages were tone (MAX=90%), dynamics (MAX=85%), and rhythm (MAX=60); the smallest maximum percentages were history (MIN=20%), phrasing (MIN=30%), ensemble (MIN=30%), form (MIN=30%), and theory (MIN=30%).

During band rehearsal, the students emphasized ensemble (M=18%), intonation (M=16%), and tone (M=13%) the most, while de-emphasizing history (M=2%), theory (M=2%), and form (M=3%) (see Appendix B). Note that each of the skills were de-emphasized by at least one student: the minimum percentage for each skill was zero.

During private lessons, the music majors emphasized tone (M=19%), technique (M=18%), and phrasing (M=15%) and de-emphasized history (M=3%), ensemble (M=3%), form (M=4%), and thoery (M=4%). As with the other two activities, each of the PFS were de-emphasized during private lessons by at least one student: the minimum percentage for each skill was zero.

Using a 5-point Likert-type scale, the music majors rated the following skills as having the most impact in developing musicianship : tone (M=4.8), phrasing (M=4.8), rhythm (M=4.7), technique (M=4.7), and dynamics (M=4.7). They valued history (M=3.6), form (M=3.7), and theory (M=3.8) the least in developing musicianship. Note that each of the skills were de-emphasized by at least one student: the minimum for each was a rating of "1" (not important). Likewise, each of the 10 skills was also rated as "very important" (a rating of 5) by at least one student.

The **Kurtosis** and **Skew** statistic was used to examine each of the 40 PFS items. The items that were closest to being normally distributed included intonation during band rehearsal (1.8, .8, respectively), technique during individual practicing (2.3, 1.2, respectively), theory during band rehearsal (2.2, 1.6, respectively), and intonation during private lessons (1.2, .9. respectively). Items that did not seem to be normally distributed included dynamics during individual practicing (33.7, 4.3, respectively), rhythm during band rehearsal (20.8, 3.5, respectively), and rhythm during private lessons (7.0. 2.0, respectively). The study's 40 PFS items do not appear to be normally distributed.

B. Preliminary Data Analysis

1. Mean Scores by Outcome Group

Mean scores were developed for each of the five outcome groups and each of the study's 40 PFS items. During individual practicing, the students with the highest MAT scores (high outcome group) emphasized tone (M=22%), technique (M=18%), rhythm (M=13%) and de-emphasized history (M=2%) and ensemble (M=3%). During band rehearsal the high outcome group emphasized ensemble (M=18%), intonation (M=18%), and phrasing (M=13%) and de-emphasized history (M=3%) and theory (M=3%). During private lessons, this group emphasized tone (M=20%) and phrasing (M=17%) and de-emphasized ensemble (M=2%), history (M=2%) and form (M=3%). The High outcome rated tone (M=4.8), phrasing (M=4.8), and dynamics (M=4.8) most important in developing musicianship and rated

form (M=3.7), theory (M=3.7), and history (M=3.8) as the least important skills. Note that when each of the development areas (i.e., practicing, band rehearsal, private lessons, and student ratings) were examined, the High and the Low outcome groups ranked the skills similarly.

2. ANOVA Analysis by Outcome Group

The study used three types of ANOVA analyses to compare the five outcome groups: Brown-Forsythe (BF), Welch ANOVA (WA), and One-Way ANOVA (OW) (see Appendix C). In the individual private lesson area, the **BF** statistic suggested a significantly *positive* trend-line for Phrasing (E1 PH), while the **WA** and the **OW** suggested a significantly *negative* trend-line for emphasis on Ensemble (E1 EN). The **BF** analysis suggested a marginally negative trend-line between the five outcome groups. During the student's band rehearsal, the OW statistic suggested a small positive impact ($p \leq .10$) when the student emphasized Ensemble, the BF statistic suggested a significantly positive impact on MI when the student emphasized Technique, and a marginally *positive* impact when Rhythm was emphasized. During the student's private lessons, the BF statistic suggested a significantly positive impact on MI when they emphasized Intonation (E3 IN), and the WA and OW analysis suggested a significantly positive impact on MI when the student emphasized phrasing (E3 PH). Finally, when the music majors rated each of the skills in importance, the BF and OW data analysis suggested a positive impact on MI when they rated Tone (E4 TO) and Intonation (E4 TO) important, and a marginal impact when they rated Phrasing (E4 PH) and Technique (E4 TE) important in developing MI.

3. Post Hoc Analysis by Outcome Group

Although the three different ANOVA analyses suggested differences among the five outcome groups, the Scheffe statistic only identified one significant relationship between two of the five outcome groups. The Scheffe statistical treatment did not identify differences between the five outcome groups for the other 39 PFS items.

4. Permutation Analysis by Outcome Group

The permutation statistic acted as an additional statistical method of preliminary exploratory data analysis. The probability of five items ordered from either large to small or from small to large is approximately 1% (i.e., $p \leq .01$) and four of the five items creating a trend line represents approximately 5% (i.e., $p \leq .05$). The permutation statistical analysis suggested an important trend line for the development of MI when the student de-emphasized Ensemble (E1 EN) during private lessons. During the band rehearsal, the trend-line analysis suggested that the students should emphasize Phrasing (E2 PH) and Ensemble (E2 EN) and de-emphasize Dynamics (E2 DY) and Form (E2 FO). During private lessons the permutation analysis suggests that the music majors should emphasize intonation (E3 IN) and phrasing (E3 PH) and de-emphasize rhythm (E3 RH). If rating an PFS item reflects the music major's musical

philosophy, students should emphasize dynamics (E4 DY) and music history (E4 HI); otherwise, the student's musical philosophy relating to the other PFSs has little or no impact on the student's MI.

2. What Performance Fundamentals (PFS) have an important impact on the student MI?

Three different regression models were used the identify the independent variables with an important impact on the student's level of MI.

A. Simple Regression

The Simple Regression (SR) statistical treatment was used to compare the relationship between each of the PFS's and the student's MI score. During individual practicing, there was a significantly *positive* relationship between the percentage of emphasis the student placed on intonation (E1 IN) and student's MI score, and a *negative* trend-line when the student emphasized ensemble (E1 EN) and form (E1 FO). During the band rehearsals, the regression analysis suggested that emphasizing intonation and phrasing and de-emphasizing form had an impact on the student MI. But during private lessons, the analysis suggested that the student should emphasize phrasing (E3 PH) and technique (E3 TE). Finally, the analysis suggests that there is an important link between how a student rates tone, intonation, phrasing, and dynamics and the student's level of MI. Note that of the 40 different simple regression analyses, 12 are negative and 28 are positive. Further, note that of the 40 simple regression analyses, there was an important (i.e., significant) relationship between 12 of the 40 PFS items, but not an important relationship for 28 other PFS items and the student's level of MI.

B. Stepwise Regression

Stepwise Regression (Forward) (STR) statistic again re-analyzed the impact the 40 PFS items had on the student MI (see Appendix F). The adjusted R^2 accounted for only 18% of the variance between the 40 PFS items and the student MI; other activities and experiences account for the 82% of the variance that was not identified and measured in the PFS study. Of the 40 different PFS items, this analysis suggests that five items had a positive impact on MI, including the percentage of time the music majors emphasize: history during individual practicing, intonation (E2 IN) during band rehearsals, phrasing (E3 PH) and technique (E3 TE) during private lessons, and how important they valued tone (E4 TO) in the development of MI. Further, the analysis suggests that the student should not emphasize ensemble (E1 EN) but should emphasize history (E1 HI) during individual practicing. Note that the authors find the importance of HISTORY during practicing somewhat puzzling. This analysis suggests that instrumental practicing is more than an phycho-motor activity—students need to think about musical style along with mastering finger movement during their practicing? Other PFS items that appeared to have a marginal, but not significant impact on MI included the percentage of time the student emphasized phrasing (E2 PH) and de-emphasized tone (E2 TO) during band rehearsals, and how important they rated theory (E4 TH), history (E4 HI), dynamics (E4 DY), and phrasing (E4 PH) in

developing MI. The study's analysis suggests that 28 PFS items appeared not to have an impact on the student's MI development.

C. Exploratory Multiple Regression

Exploratory Multiple Regression (EMR) statistic was used to confirm the variables identified in the study's earlier Simple Regression and Stepwise Regression analyses. One PFS item was added to the Multiple Regression analysis at a time, and the resulting t-value and probability were re-examined. During the EMR analysis, every PFS item was added to the analysis. The adjusted R^2 for the EMR analysis was .175, meaning that 18% of the variance between the seven independent variables and the study's dependent variable was accounted for (see Appendix G). The EMR analysis suggests that music majors should emphasize history (E1 HI) and de-emphasize ensemble (E1 EN) during practicing, emphasize intonation (E2 IN) during band rehearsals, emphasize phrasing (E3 PH) and technique (E3 TE) during private lessons, and rate tone (E4 TO) and dynamics (E4 TO) important in developing MI. Note that 33 of the 40 PFS items were not identified in the EMR analysis.

3. What percentage of impact does each of the important Performance Fundamentals have on the student's MI development?

The Guttman's Partial correlation (GPC) statistical treatment was used to examine the percentage of influence or educational impact each of the 40 PFS items had on the student level of MI. The GPC analysis suggests that the eight identified PFS items account for 19.5% of the variance between the independent variables and the dependent variable (student MI) (see Appendix G). The GPC analysis suggests that music majors should emphasize history (+2.5%) and de-emphasize ensemble (-3%) during practicing, emphasize intonation (+1.6%) and phrasing (+1.6%) during band rehearsals, and emphasize technique (+3.1%) and phrasing (+3.1%) during private lessons. The student's musical philosophy is reflected by the music major's ratings of the 10 PFS items importance in developing MI. The GPC analysis suggests that music majors should strongly value the importance of tone (+2.4%) and dynamics (+2.3%) in developing their MI. Of the 10 PFS items, only tone and dynamics exhibited a positive trend line for MI development; the ratings of the other 8 items were scattered equally among both low and high outcome music majors.

VII. CONCLUSIONS

1. Phrasing and Intonation are two of the primary "artistic" cornerstones in the student's MI development.

Music majors should emphasize different Performance Fundamentals during practicing, band rehearsals, or private lessons. Phrasing and intonation seem to be the two most important PFSs and

have the largest impact on the student's MI, while tone, technique, history, and dynamics also have a marginal impact on MI.

A. Phrasing The study's data analysis suggests that phrasing is very important during band rehearsal and private lessons, and should be reflected as an essential component of a student's musical philosophy (see Appendix H). Students with "high" MI know that phrasing is very important in developing musicianship (see Appendix C). Further, after the multicollinearity issue is resolved, the EMR reflects that mastering musical phrasing is essential during both individual practicing and during band rehearsals.

Barker (1923, p. 149) defines phrasing as: "1. The bringing-out into proper relief of the phrases (whether motives, figures, subjects, or passages), both as regards their individual melodic and rhythmic characterization and their relative importance." Piston (1947, p. 35-36) writes: ". . . not single measures but whole melodic units, or phrases, should serve as the basis for the interpretation of melodic rhythm. One should first find the chief point, or points, of stress, then those of secondary importance, and note the position and relation of these points in reference to the phrase as a whole." Phrasing is one of the primary cornerstones in the development of MI. When phrasing in not present, there is no musicianship. How often have we heard performers play the correct notes in tune, with correct dynamics, meter, and rhythms, yet lack musicality?

B. Intonation Mastering intonation during ensemble performances and recognizing its importance in developing MI (i.e., a reflection of the student's musical philosophy) is strongly linked to the student's musical growth (see Appendix H). There is a significant, positive link between the percentage of time students emphasize intonation during band rehearsals and how high they rate intonation in developing MI. The data analysis also suggests that intonation has a marginal impact on MI during private lessons and during individual practicing, although in these musical environments, the instrumentalist is not expected to play "in tune" with other instrumentalists. Instrumentalist select or reject instruments depending on how well they play in tune. Performances are rated poorly when the performers do not play in tune. When a note is played out of tune, it is actually a wrong note instead of a right note. Playing in tune for a musician is similar to correct grammar for an author—it is a basic fundamental that is essential for a finished artistic product.

C. Tone, technique, music history, and dynamics have a marginal association with MI.

1. Tone According to this study, four PFs including tone, technique, music history, and dynamics have a marginal impact on the student's level of MI. However, high MI students rate tone (E4 TO) as being very important in MI development, and the authors concur with this rating. Admittedly, musicians and lay persons might have a dramatically different definition and corresponding standards for the notion

of "good tone". Great violinists are willing to pay millions of dollars for a Stradivarius that has a superior tone. A great clarinetist might try, and eventually eliminate, dozens of reeds before selecting "just the right" reed for the performance, but an amateur clarinetist, not being able to discriminate between a good and a great tone, might settle on the first reed out of the box and play it on their student model clarinet. Many instrumentalists spend great amounts of time and money searching for the "right" instrument, mouthpiece, and instrument overhaul in order to improve their sound.

2. **Technique** There seems to be an important link between technique during the students private lessons (E3 TE) and student's MI development. Unfortunately, Colwell did not design and write subtests requiring students to discriminate between a passage played with superior technique and another passage performed with sloppy technique. Exquisite or superior technique might be demonstrated when the listener comfortably hears every note evenly, regardless of the speed or technical demands of the musical passage. The authors suggest that great musicians are able to discriminate between good and bad technique, while average or weak musicians are often unaware of subtle nuance. Average musicians might evaluate technique (incorrectly calling it musicianship) by counting the number of right or wrong notes played while excellent musicians realize that the number of right or wrong notes are only a portion of the total equation of musicianship.

3. **History** The term music "history" is very misleading, especially to a non-musician or amateur musician who might think it is nothing more than knowing how many symphonies Beethoven wrote, when Bach lived and died, or in what country Handel composed most of his music. These are examples of elementary musical knowledge, which is an elementary step in the development of MI. Knowing how to critically listen to and evaluate music from different historical periods represents a more advanced MI skill (Bobbett, Musical Hierarchy).

When the study's data analysis is examined, the Stepwise Regression, Exploratory Multiple Regression, and the Guttman's Partial Correlation collectively suggest that "history" should be an essential aspect of the student's instrumental practicing because it positively impacts the student's MI growth. This conclusion makes sense, because there is a tremendous difference in performing Stravinsky, Beethoven, and Debussy. Perhaps current music history education needs re-thinking or re-structuring. Composers write with a unique musical style consisting of their own method of orchestration, harmonic progressions, sonorities, and instrumentation (usually within the context of the historic time period in which they lived). When considering these musical parameters, music history takes on a much expanded and complex dimension. Sometimes, music history is taught as no more than the simple identification of musical excerpts i.e. "drop the needle." Music history should include the analysis and evaluation of musical style and performance, it should focus on the music itself and not on peripheral and non-musical facts.

Colwell's MAT4, subtest 1 titled "Musical Style" tests the participant's listening and ability to differentiate between Haydn and Beethoven (#1), Schoenberg and Wagner (#5), or Ives and Debussy (#9). In each example, there are common and dissimilar musical characteristics. Haydn and Beethoven wrote with similar musical form, Schoenberg and Wagner wrote with poly-tonality and dissonance, and Ives and Debussy were both 20th-century composers. To advanced musicians, there are vast differences between the compositional styles of these different composers. Less advanced musicians do not possess the contextual knowledge to differentiate between different styles and genres.

4. **Dynamics** None of Colwell's MAT3 or MAT4 subtests evaluated the student's skill in dynamic discrimination. Yet, "High" MI students recognize the importance of dynamics in developing musicianship while "Low" MI students do not recognize its importance. Further, the study's three regression models and the partial correlation analysis suggests that valuing dynamics is essential to excellent musicianship. Dynamics is not "loud or soft", but is loud or soft only when compared to something else. Musicianship might be defined as the ability to discriminate subtleties. There is a difference between playing forte in Haydn or Bartok, or in playing a crescendo in Mozart and Tchaikovsky. Excellent musicians can differentiate and demonstrate subtle dynamic nuance.

D. Theory, form, rhythm, and ensemble have a SMALLrelationship with MI development.

1. **Theory** None of Colwell's MAT3 or MAT4 subtests evaluated the student's skill in dynamic discrimination. Yet, "High" MI students recognize the importance of dynamics in developing musicianship while "Low" MI students do not recognize its importance. Further, the study's three regression models and the partial correlation analysis suggests that valuing dynamics is essential to excellent musicianship. Dynamics is not "loud or soft", but is loud or soft only when compared to something else. Musicianship might be defined as the ability to discriminate subtleties. There is a difference between playing forte in Haydn or Bartok, or in playing a crescendo in Mozart and Tchaikovsky. Excellent musicians can differentiate and demonstrate subtle dynamic nuance.

2. **Form** If music students have trouble differentiating between Haydn and Brahms, or between a major third and a perfect fourth, then a discussion of the relative importance of musical form, and its impact on the student's level of MI, becomes an exercise in futility. The understanding of musical form is an advanced artistic skill, and since Colwell's MAT3 and MAT4 were written for high school students, the issue of musical form was never included as a critical component in these musical achievement tests. Virtually all western art music has form as determined by repetition, variation, and contrast. If musicians are struggling to master the elementary aspects of musicianship, introducing them to an advanced aspect of artistry is a wasted effort.

3. **Rhythm** Rhythm is one of the most elementary elements of music. When the High and Low student data analysis is examined (see Appendix C),high MI students emphasize rhythm less than low MI students during individual practicing, band rehearsals, and during private lessons. Colwell includes rhythmic discrimination as a measure of musical achievement, but does not evaluate the more advanced MI levels (MAT3 and MAT4 were designed for middle and high school students). Further, the study's other data analysis suggests no important link between the student's level of MI and rhythm.

4. **Ensemble** Ensemble may be defined as the ability of one performer to play musically with another musician. This includes such things as being able to play in tune, to blend and balance, to be rhythmically accurate, and to match style of note length and inflection with other instrumentalists. It is often used as a descriptor for the ability of an ensemble to perform with a single, unified concept of how a work "should go." Ensemble may only exist when one is performing with others. The one measurable observation noted from this study's data analysis is that the larger the percentage of time a student emphasizes it during practicing, the more the student lacks MI. The data analysis reflects that when the students emphasized ensemble during practicing, there was a significantly negative impact on the student's level of MI. The authors are still wondering how students can practice in a room by themselves and still emphasize "ensemble" as much as 5% of the time. The authors concede that this represents a questionable item included in the ICS-2.

2. **Not every college musical activity or experience is a positive or edifying experience for music majors.**

Prior to the development of the ICS-2, the authors idealistically assumed that all college experiences must represent a positive experience for the music major. The PPM correlation illustrated a significantly negative relationship between the percentage of time a student emphasized "ensemble" (E1 EN) during practicing and MI, and a negative relationship between the percentage of time they emphasized "form" (E2 FO) during band rehearsals and MI. The SIR analysis suggested a negative relationship between MI and the percentage of time the student emphasized ensemble (E1 EN) and the percentage of time they emphasized form (E1 FO) during practicing, but also suggested a negative relationship between MI and the percentage of time the music majors emphasized tone (E2 TO) and form (E2 FO) during band rehearsals, and ensemble playing (E3 EN) during private lessons. The SIR analysis also reflects that of the 40 items, 12 were negative—30% of the study's independent variables.

When the PPM correlation matrix is examined for relationships other than relating to the student level of MI, 11 significantly negative ($p \leq .01$) relationships are observed including:

	r	Skill & Activity		Skill & Activity
1	-.46	Tone [Private Lessons]	v.	Dynamics [Band Rehearsal]
2	-.45	Tone [Private Lessons]	v.	Rhythm [Band Rehearsal]
3	-.41	Tone [Practicing]	v.	Rhythm [Private Lessons]

4	-.40	Tone [Private Lessons]	v.	Dynamics [Practicing]
5	-.35	Tone [Practicing]	v.	Dynamics [Private Lessons]
6	-.32	Tone [Practicing]	v.	Form [Private Lessons]
7	-.33	Tone [Student Rating]	v.	Rhythm [Practicing]
8	-.32	Tone [Band Rehearsal]	v.	Ensemble [Band Rehearsal]
9	-.32	Rhythm [Band Rehearsal]	v.	Intonation [Band Rehearsal]
10	-.30	Form [Band Rehearsal]	v.	Intonation [Band Rehearsal]
11	-.30	Tone [Private Lessons]	v.	History [Private Lessons]

Of the 11 identified negative correlations, 9 are related to "tone". It appears that while tone could be represented as being at one end of the spectrum, rhythm and dynamics might be at the opposite end. Further, maybe tone represents a more advanced portion of artistry and musicianship while rhythm and dynamics represent a more elemental portion of artistry and musicianship.

3. **There is a very strong link between what is taught by the private teacher and what a student practices.**

Often, when analyzing data from a variety of perspectives, unexpected findings are observed. The Pearson Product Moment correlation matrix suggests that there is a very strong ($p \leq .01$) relationship between each of the 10 PFs that are taught during the student's private lessons and what is actually emphasized during individual practicing. The determination of coefficient ("r") ranges from a low of +.32 (E1 EN v. E3 EN) to a high of =.75 (E1 TO v. E3 TO). This study's analysis strongly suggests that private instrumental teachers have a very strong impact on shaping the music majors' musical philosophy relating to all of the 10 PFs.

4. **The selection and use of statistical analysis has a large impact on the study's findings and conclusions.**

This study used 10 different statistical methods to examine the impact PFs have on the student's level of MI including: (1) opinions, (2) permutation statistic, (3) Pearson Product Moment correlation, (4) Brown-Forsythe (ANOVA), (5) Welch ANOVA, (6) One-Way ANOVA, (7) Simple Regression, (8) Stepwise Regression, (9) Exploratory Multiple Regression, and (10) Guttman's Partial Correlation. The summary analysis (see Appendix H) strongly suggests that any research has the possibility of being flawed when it relies on only one or two methods of statistical data analysis. The authors further suggest that when current educational research projects use methods #1 through #6 (see items mentioned above), their findings and conclusions could be quite flawed or very misleading.

One type of statistical data analysis should confirm the findings of another type of another statistical data analysis. In this study, authors used a simple procedure of identifying and summing (i.e., when an item had a significant impact on MI it assigned a "+1", and when there was the possibility of a marginal impact, it was assigned "+.5") the items that appeared to impact MI. Using this simplified procedure, there is a strong and persuasive case that independent variables E1EN, E3PH, and E4TO

have a strong impact on the study's dependent variable (Summed; 8.5, 8.0, and 7.5, respectively). Further, each of the three independent variables were identified by each of the three regression models and the partial correlation statistical model. The study suggests that independent variables E4DY, E2IN, E2PH, E4IN, and E3TE also have a meaningful impact on MI (summed: 5.5, 5.0, 4.5, 4.5, 4.0, respectively). Of these five variables, E4DY, E2IN, and E32TE were identified by the study's three regression models and the partial correlation model, while E2PH and E4IN were primarily identified by the study's preliminary data analysis (#1 through #6). The study's different statistical methods further suggested that there were 16 other independent variables that might have some impact on MI.

If a research study relies solely on methodology such as opinions, permutations, correlations, or outcome groupings using some type of ANOVA statistical treatment, this type of hypothetical research would have identified 16 variables in this study as having an important impact on the dependent variable.

VIII. A Discussion

Much existing educational research, based solely on expert opinion or of faulty research design, is of questionable value. While gathering opinions may be a worthy project, it is not an appropriate substitute for data analysis. Decisions and policy making, in music education and education in general, are more likely to be based on opinion, fad, or political climate than on the analysis of available data. The type of statistical treatment selected for analysis is also an important consideration. Unfortunately, much educational research relies solely on simple correlational analysis, post hoc analysis, or inappropriate regression analysis. This provides a partial, often skewed, view of the data. The application of a variety of advanced statistical analyses, that validate each other from a variety of perspectives, provides a more complete and accurate assessment of the data. Even the most rigorous research requires additional validation. The authors believe music educators should reevaluate music curricula based on knowledge and the findings of rigorous research, rather than opinions, fads, or political climate. Without knowledge there is no discrimination; without accountability there is no credibility.

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Authors Notes

The authors would like to thank Dr. James Croft, Director of Bands at Florida State University, Dr. Joseph Scagnoli, Director of Bands at Ball State University, and Dr. Victor Markovich, Director of Bands at Wichita State University, and their instrumental students for participating in this research project. The authors would like to make a special thanks to Dr. Richard Colwell for developing these music achievement tests plus his enthusiastic sponsorship and encouragement for this and many past projects.

This study reflects a variety of expertise in many additional fields outside of "music education". The authors would like to extend their thanks the University of Tennessee-Knoxville's Statistics Department, and especially Dr. Esteban Walker and Dr. John Philpot for their statistical consultation throughout the organization and writing if this paper. In addition, the authors extend a special thanks to Dr. Charles "Chuck" M. Achilles at the University of Eastern Michigan-Ypsilanti, for his past and present suggestions regarding research design plus many editorial revisions. Simply, without the assistance of variety of experts, representing variety of specialities, and assisting in a variety of ways, this paper could not have been completed.

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INSTRUMENTAL COLLEGE SURVEY-2

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A. General

Social Security Number_____ **Instrument** _____

1. Instrumental Organization _____
2. College rank: (Fr) (So) (Jr) (Sr) (Masters) (Doctoral)
3. College major: Music ( ), Non-music ( )
4. Total years you have played your band instrument (*grade school to present*): _____
5. What grade did you start band?_____

- Gender (M) (F)
- College GPA _____
- Age _____

B. College Course Work

1. How many hours a week do you:
   a. Practice Instrument _____
   b. Study non-music course work _____
2. Number of semester (quarter) classes you have completed in each area
3. Your average grade in each area (*A-B-C-D-F*)

Using the following scale for Questions 4-5,
***RATE** each activity as to its importance in:*

	Private (Inst.) Lessons	Ear training	Theory	Keyboard/Piano	Music History	Conducting	Music Education	Voice/Choir	Inst. Ensemble	General Academic
5 VERY important 4 Important 3 Somewhat Important 2 Little Importance 1 NOT important										

4. Developing musicianship
5. In your opinion, how would the music faculty **RATE** each area's importance?
6. The music course(s) that helped your musicianship the **most**? _____
   _____ **Least**? _____

C. High School Music Activities

1. High school GPA _____
2. ACT score _____ SAT score _____
3. Excellent high school musicians emphasize _____
4. How many **YEARS** did you participate in each of these high school activities?

Using the following scale for Questions 5-6,
***RATE** each activity as to its importance in developing **MUSICIANSHIP**:*

5. Your **Musical Development**
6. In your opinion, how would your high school **Band Director** rate each area's importance?

	All-State Band	All-State Orchestra	All-State Jazz Band	All-State Choir	Concert Festival	Solo-Ensemble	Marching Contests	Private Lessons	Church/Community Choir	High School Jazz Band	Community Band
5 Very important 4 Important 3 Somewhat Important 2 Little Importance 1 Not important											

OVER

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D. College Music Activities

1. The percentage (%) of time you use a metronome during practicing?_____

Make sure Questions 2 and 3 each add up to 100%

What percentage (%) of time do you spend on the following activities during:

2. **Individual Practicing**
3. **Private Lessons** (*Major Inst.*)

Using the following scale for Questions 4-6, give YOUR PERCEPTION of how the following individuals would **RATE** each activity's importance in developing **MUSICIANSHIP**:

4. **Yourself**
5. Your private instrumental **Teacher**
6. Your college **Band Director**

Scales	Etudes	Thirds/Arpeggios	Band Music	Sight-reading	Solos	Improvisation	Other	
								=100%
								=100%
5 = VERY Important, 4 = Important, 3 = Somewhat Important, 2 = Little Importance, 1 = NOT Important								

7. Number of minutes per month you make a audio/video recording of your playing _____
8. Number of minutes per week you ask a **classmate/friend/faculty member** (*exclude private instrument teacher*) to listen/critique your instrument playing _____

E. Musicianship

Make sure Questions 1, 2, and 3 each add up to 100%

What percentage (%) of time is spent practicing / thinking about these music items during:

1. **Individual Practicing?**
2. **Band Rehearsal?**
3. **Private Lessons ?**

*Using the following scale for Questions 4-5, **RATE** each activity in developing musicianship from the following perspectives:*

4. Its **Importance**
5. How **Difficult** is it to learn/master

Tone	Intonation	Phrasing	Ensemble	Technique	Dynamics	Rhythm	History	Form	Theory	
										=100%
										=100%
										=100%
5 = VERY Important Difficult, 4 = Important Difficult, 3 = Somewhat Important, 2 = Little Importance, 1 = NOT Important Difficult										

6. When Performing, **excellent** instrumental musicians listen to/emphasize_____ while **poor** instrumental musicians listen to/emphasize _____

Appendix B

Music Majors

n=275

Ball State U., Florida State U., and Wichita State U. (Spring,1992 data)

#1. Individual Practicing

Percentage of Time Spent During

	Artistic Activities	Number	MEAN %	Stand. Dev.	Minimum	Maximum	Range	Kurtosis	Skewness
1	Tone	264	**19.2**	13.4	0	90	90	4.27	1.51
2	Intonation	264	11.6	7.6	0	50	50	2.08	0.80
3	Phrasing	264	12.1	6.1	0	30	30	-0.05	0.38
4	Ensemble	264	4.5	.3	0	30	30	3.81	1.65
5	Technique	264	**17.6**	9.3	0	51	51	2.30	1.24
6	Dynamics	263	11.6	7.7	0	85	85	33.73	4.25
7	Rhythm	263	14.1	10.1	0	60	60	4.35	1.93
8	History	262	1.9	3.1	0	20	20	5.45	2.12
9	Form	263	4.0	4.8	0	30	30	3.80	1.59
10	Theory	263	3.5	4.5	0	30	30	5.21	1.85

#2. Band Rehearsal

Percentage of Time Spent During

1	Tone	259	12.9	8.7	0	50	50	2.29	1.19
2	Intonation	260	**15.7**	8.3	0	52	52	1.75	0.80
3	Phrasing	260	11.8	5.8	0	30	30	0.57	0.50
4	Ensemble	260	**17.7**	11.3	0	80	80	7.60	2.19
5	Technique	260	10.7	7.9	0	52	52	7.44	2.03
6	Dynamics	260	11.9	5.8	0	45	45	4.47	1.48
7	Rhythm	260	11.0	7.9	0	75	75	20.79	3.47
8	History	260	2.3	3.3	0	10	10	0.30	1.22
9	Form	260	3.3	4.1	0	20	20	0.25	1.05
10	Theory	260	2.3	3.6	0	20	20	2.23	1.58

#3. Private Lessons

Percentage of Time Spent During

1	Tone	253	**19.0**	13.2	0	90	90	5.82	1.73
2	Intonation	253	10.9	7.6	0	40	40	1.19	0.88
3	Phrasing	253	**14.9**	7.8	0	52	52	2.47	0.97
4	Ensemble	253	2.7	4.2	0	20	20	2.29	1.60
5	Technique	253	**18.1**	8.9	0	60	60	3.70	1.46
6	Dynamics	251	11.6	6.0	0	50	50	6.11	1.43
7	Rhythm	253	12.7	8.0	0	60	60	6.93	1.96
8	History	253	2.6	3.6	0	15	15	0.55	1.24
9	Form	253	3.8	4.5	0	20	20	0.35	1.03
10	Theory	253	3.6	4.6	0	30	30	4.60	1.71

#4. Importance

Likert-type Rating (i.e., 1=not important & 5=Very Important)

1	Tone	259	**4.79**	.53	1	5	4	13.92	-3.24
2	Intonation	259	4.68	.70	1	5	4	11.10	-3.03
3	Phrasing	259	**4.75**	.56	1	5	4	10.10	-2.77
4	Ensemble	259	4.46	.74	1	5	4	0.98	-1.21
5	Technique	259	4.69	.62	1	5	4	7.00	-2.39
6	Dynamics	259	4.67	.62	1	5	4	5.85	-2.17
7	Rhythm	258	**4.70**	.62	1	5	4	6.59	-2.36
8	History	257	3.60	1.05	1	5	4	-0.49	-0.30
9	Form	255	3.74	1.05	1	5	4	-0.66	-0.35
10	Theory		3.75	1.05	1	5	4	-0.46	-0.44

Inferential Analysis

	Artistic Activities	Rank-High	1 Mean Scores by Outcome groups: High	Med. High	Average	Med. Low	Low	Rank-Low	2 Brown-Forsythe: F Ratio	p	3 Welch Anova: F Ratio	p	4 One-Way Anova: F Ratio	p	5 Scheffe	6 Permutation: p	Range	* Grand Summary
	n=		48	92	63	46	27											
Q1. % Time spent during INDIVIDUAL PRACTICING																		
1	Tone (TO)	10	21.8	18.3	18.2	21.7	16.1	5	.85	.49	1.10	.36	1.30	.27	---	---	---	
2	Intonation (IN)	8	12.0	12.5	11.6	11.3	8.6	1	.59	.67	1.29	.28	1.34	.25	---	---	---	
3	Phrasing (PH)	7	13.1	11.8	12.0	12.4	10.9	6	4.04	.00	.55	.70	0.67	.61	---	---	---	1.0
4	Ensemble (EN)	2	2.9	3.7	5.1	5.9	8.1	4	2.20	.07	3.11	.02	3.37	.01	---	0.01	HI - LO	3.5
5	Technique (TE)	9	17.9	18.4	18.8	15.6	15.2	9	.45	.78	1.34	.26	1.26	.28	---	---	---	
6	Dynamics (DY)	5	11.6	11.4	10.9	13.8	11.3	7	.87	.48	.47	.76	0.49	.74	---	---	---	
7	Rhythm (RH)	6	13.2	14.0	13.7	13.6	15.7	10	1.35	.25	.73	.57	1.30	.27	---	---	---	
8	History (HI)	1	1.9	2.4	1.5	1.3	1.9	1	1.41	.23	1.52	.20	1.28	.28	---	---	---	
9	Form (FO)	3	3.7	3.8	3.4	4.1	4.9	3	1.90	.11	.68	.61	1.28	.28	---	---	---	
10	Theory (TH)	4	3.8	3.4	3.6	4.9	2.1	2	.86	.49	1.10	.36	0.82	.52	---	---	---	
Q2. % Time spent during BAND REHEARSAL																		
1	Tone (TO)	7	11.8	12.4	12.3	13.1	14.8	8	1.53	.19	.98	.42	1.26	.29	---	---	---	
2	Intonation (IN)	3	17.2	15.3	15.7	15.0	14.2	6	1.16	.33	.95	.45	.94	.44	---	---	---	
3	Phrasing (PH)	6	13.4	12.4	10.7	11.3	10.2	4	1.44	.22	1.93	.11	2.30	.06	---	0.05	HI-LO	1.0
4	Ensemble (EN)	10	18.3	17.8	18.0	17.9	15.5	10	.29	.89	.36	.83	.27	.90	---	0.05	HI-LO	0.5
5	Technique (TE)	4	8.9	11.7	11.5	10.4	9.4	4	3.07	.02	1.49	.21	1.38	.24	---	---	---	1.0
6	Dynamics (DY)	5	11.0	11.9	12.2	11.7	10.3	7	.33	.86	.58	.68	.61	.66	---	0.05	HI-LO	
7	Rhythm (RH)	8	10.1	11.0	12.1	9.7	11.7	8	1.96	.10	1.41	.24	.81	.52	---	---	---	0.5
8	History (HI)	1	2.5	2.4	2.1	1.9	3.7	1	.37	.83	.33	.85	.36	.84	---	---	---	
9	Form (FO)	2	2.8	3.1	3.0	3.5	4.8	3	.57	.68	.83	.51	1.17	.33	---	0.05	HI-LO	0.5
10	Theory (TH)	9	2.6	2.2	1.9	2.7	3.1	9	.69	.60	.68	.61	.69	.60	---	---	---	
Q3. % Time spent during PRIVATE LESSONS																		
1	Tone (TO)	10	20.2	17.4	18.7	21.7	18.3	10	.86	.49	1.10	.36	.85	.50	---	---	---	
2	Intonation (IN)	7	12.6	10.0	12.0	11.0	8.0	3	4.04	.00	.55	.70	2.24	.07	---	0.05	HI-LO	2.0
3	Phrasing (PH)	8	17.0	15.4	14.4	14.4	10.7	6	2.20	.07	3.11	.02	2.81	.03	4	0.01	HI-LO	3.5
4	Ensemble (EN)	1	2.4	2.4	3.0	2.9	3.2	1	.33	.85	.34	.85	.34	.85	---	---	---	
5	Technique (TE)	9	18.6	18.6	18.2	15.5	16.5	9	.55	.70	1.59	.18	1.49	.21	---	---	---	
6	Dynamics (DY)	5	10.2	12.3	11.1	11.8	10.9	7	1.13	.34	2.29	.07	1.9	.11	---	---	---	0.5
7	Rhythm (RH)	6	11.3	12.3	12.8	13.4	13.0	8	1.00	.41	.88	.48	.99	.42	---	0.01	HI-LO	1.0
8	History (HI)	2	2.4	2.8	2.5	2.0	3.7	2	1.14	.34	.82	.52	1.00	.41	---	---	---	
9	Form (FO)	3	2.8	3.8	3.7	3.7	5.0	4	1.64	.17	1.52	.20	1.96	.10	---	---	---	0.5
10	Theory (TH)	4	3.4	4.0	2.9	3.8	4.0	5	.69	.60	.69	.60	.58	.67	---	---	---	
Q4. % Student's Rating--Importance in Developing Musicianship																		
1	Tone (TO)	10	4.79	4.87	4.84	4.60	4.57	9	3.66	.00	2.36	.06	3.66	.01	---	---	---	2.5
2	Intonation (IN)	6	4.70	4.77	4.81	4.50	4.35	4	2.91	.02	2.12	.09	2.91	.02	---	---	---	2.5
3	Phrasing (PH)	8	4.77	4.84	4.77	4.64	4.48	8	2.30	.06	1.60	.18	2.30	.06	---	---	---	1.0
4	Ensemble (EN)	5	4.58	4.42	4.53	4.33	4.48	6	.78	.54	.67	.61	.69	.60	---	---	---	
5	Technique (TE)	4	4.51	4.80	4.74	4.67	4.52	7	2.23	.07	1.70	.16	2.23	.07	---	---	---	1.0
6	Dynamics (DY)	9	4.71	4.74	4.65	4.55	4.52	8	1.21	.31	1.04	.39	1.21	.31	---	0.01	HI-LO	1.0
7	Rhythm (RH)	7	4.72	4.74	4.69	4.60	4.70	10	.39	.81	.40	.81	.40	.81	---	---	---	
8	History (HI)	1	3.91	3.67	3.40	3.65	3.39	1	.72	.58	1.13	.35	1.24	.29	---	0.05	HI-LO	0.5
9	Form (FO)	1	3.67	3.91	3.69	3.80	3.70	3	.73	.57	.19	.94	.20	.94	---	---	---	
10	Theory (TH)	2	3.70	3.91	3.61	3.88	3.48	2	1.80	.13	1.19	.32	1.28	.28	---	---	---	

Mean Scores: Box = Largest Mean Score, and Shaded = Smallest Mean score. **Variance and Category Analysis**: Bold/Underline = significant difference (p≤.05); Bold/Double underline = p≤.10 to .05.

* **Grand Summary** Code: Box (i.e., significant p≤.05) =1; Double Underline (p≤.10 to .05) =.5; Permutation: .01=1; .05 = .05

Scheffe

1=High & Med. High	6=Med. High & Med. Low
2=High & Average	7=Med. High & Low
3=High & Med. Low	8=Average & Med. Low
4=High & Low	9=Average & Low
5=Med. High & Average	10=Med. Low & Low

Appendix D

Pearson Product Moment Correlation (Matrix)

	Student Outcome SUBTESTS									TESTS			Q 1. % of time during INDIVIDUAL PRACTICING								
	3ST1	3ST2	3ST3	3ST4	4ST1	4ST2	4ST3	4ST4	4ST5	MAT3	MAT4	GT	E1 TO	E1 IN	E1 PH	E1 EN	E1 TE	E1 DY	E1 RH	E1 HI	E1 FO	E1 TH
3ST1	###	.34	.40	.23	.21	.25	.21	.32	.33	.70	.40	.59	-.09	.01	.08	-.02	.02	-.06	.00	.04	-.03	.06
3ST2	.34	###	.41	.20	.25	.35	.38	.28	.34	.76	.50	.69	.09	.13	.03	-.18	.01	-.08	-.09	.01	-.06	.06
3ST3	.40	.41	###	.15	.27	.34	.22	.26	.31	.79	.45	.67	.00	.11	.05	-.16	-.01	-.05	.01	.06	-.09	-.03
3ST4	.23	.20	.15	###	.34	.17	.10	.17	.14	.43	.31	.40	-.08	.00	-.03	-.01	.16	.07	-.02	.05	.00	.04
4ST1	.21	.25	.27	.34	###	.24	.12	.15	.27	.37	.65	.59	-.04	.02	.00	-.09	.17	-.04	-.12	.21	.00	.04
4ST2	.25	.35	.34	.17	.24	###	.29	.30	.33	.42	.71	.64	-.01	.10	.04	-.20	.05	-.02	.01	.01	-.08	-.03
4ST3	.21	.38	.22	.10	.12	.29	###	.22	.23	.35	.57	.53	.07	-.02	.07	-.19	.03	.01	-.04	-.08	-.01	-.04
4ST4	.32	.28	.26	.17	.15	.30	.22	###	.40	.38	.57	.54	-.06	.10	.10	-.07	.07	-.03	-.01	-.06	-.05	-.02
4ST5	.33	.34	.31	.14	.27	.33	.23	.40	###	.42	.65	.61	.02	.09	-.05	-.13	.07	.07	-.01	.06	-.08	-.01
MAT3	.70	.76	.79	.43	.37	.42	.35	.38	.42	###	.61	.87	-.01	.11	.06	-.16	.04	-.06	-.04	.06	-.08	.04
MAT4	.40	.50	.45	.31	.65	.71	.57	.57	.65	.61	###	.92	-.01	.09	.05	-.22	.13	-.01	-.06	.07	-.06	-.02
GT	.59	.69	.67	.40	.59	.64	.53	.54	.61	.87	.92	###	-.01	.11	.06	-.21	.10	-.04	-.06	.07	-.08	.01
E1 TO	-.09	.09	.00	-.08	-.04	-.01	.07	-.06	.02	-.01	-.01	-.01	###	.06	-.12	-.28	-.16	-.28	-.52	-.26	-.29	-.20
E1 IN	.01	.13	.11	.00	.02	.10	-.02	.10	.09	.11	.09	.11	.06	###	.05	-.16	-.24	-.23	-.32	-.03	-.11	-.08
E1 PH	.08	.03	.05	-.03	.00	.04	.07	.10	-.05	.06	.05	.06	-.12	.05	###	-.16	-.14	.04	-.15	-.12	.01	-.11
E1 EN	-.02	.10	.16	-.01	-.09	.20	.19	-.07	-.13	.16	.22	.21	-.28	-.16	-.16	###	-.09	-.02	-.04	.17	.14	.20
E1 TE	.02	.01	-.01	.16	.17	.05	.03	.07	.07	.04	.13	.10	-.16	-.24	-.14	-.09	###	.06	.03	-.21	-.30	-.27
E1 DY	-.06	-.08	-.05	.07	-.04	-.02	.01	-.03	.07	-.06	-.01	-.04	-.28	-.23	.04	-.02	.06	###	.23	-.05	-.04	-.10
E1 RH	.00	-.09	.01	-.02	-.12	.01	-.04	-.01	-.01	-.04	-.06	-.06	-.33	-.32	-.15	-.04	.03	.23	###	-.03	-.02	-.09
E1 HI	.04	.01	.06	.05	.21	.01	-.08	-.06	.06	.06	.07	.07	-.26	-.03	-.12	.17	-.21	-.05	-.03	###	.30	.30
E1 FO	-.03	-.06	-.09	.00	.00	-.08	-.01	-.05	-.08	-.08	-.06	-.08	-.29	-.11	.01	.14	-.30	-.04	-.02	.30	###	.45
E1 TH	.06	.06	-.03	.04	.04	-.03	-.04	-.02	-.01	.04	-.02	.01	-.20	-.08	-.11	.20	-.27	-.10	-.09	.30	.45	###
E2 TO	-.08	.02	.02	-.02	-.10	-.13	-.01	-.10	-.10	-.01	-.13	-.10	.41	.14	-.13	-.08	-.27	-.14	-.20	-.10	-.06	.00
E2 IN	.05	.15	.16	.06	.10	.08	.06	.09	.10	.17	.14	.17	.22	.51	.09	-.12	-.12	-.11	-.27	-.19	-.14	-.05
E2 PH	.12	.08	.10	.17	.12	.08	.10	.10	.04	.15	.14	.16	.09	.03	.34	-.10	.02	-.02	-.16	-.08	-.05	-.12
E2 EN	.08	.05	.02	-.03	.04	.12	.00	.00	.06	.05	.07	.07	-.05	.03	.07	-.04	.05	-.02	.08	.04	-.08	-.04
E2 TE	-.03	-.11	-.14	.09	.10	.04	-.01	.08	-.01	-.10	.07	-.01	-.11	-.13	-.15	.04	.26	.17	.05	-.09	-.07	-.17
E2 DY	.02	-.12	-.01	-.13	-.11	.03	.01	.00	-.02	-.09	-.09	-.10	-.17	-.18	.05	.02	.07	.20	.25	-.08	.01	-.15
E2 RH	-.03	-.04	-.01	-.09	-.06	.03	-.02	.04	-.07	-.05	-.03	-.05	-.17	-.18	-.02	.08	.09	.05	.27	-.06	-.04	-.06
E2 HI	-.04	.06	-.08	.11	.09	-.09	-.03	-.14	-.05	-.01	-.05	-.03	-.14	-.14	-.11	.22	-.06	.05	-.09	.46	.24	.26
E2 FO	-.08	-.18	-.08	-.02	-.01	-.11	-.07	-.11	-.10	-.13	-.13	-.13	-.22	-.13	-.13	.19	-.19	.03	.07	.36	.48	.28
E2 TH	-.06	-.04	-.16	.00	.02	-.10	-.03	-.04	.01	-.11	-.08	-.10	-.13	-.11	-.10	.11	-.17	-.08	-.08	.37	.42	.60
E3 TO	-.10	.06	-.02	-.10	-.10	-.08	-.05	-.06	-.01	-.04	-.10	-.08	.75	.10	-.09	-.19	-.20	-.20	-.40	-.22	-.21	-.11
E3 IN	.06	.14	.22	-.01	-.08	.08	.03	.07	-.06	.18	.00	.09	.10	.66	.00	-.17	-.15	-.19	-.21	-.09	-.11	-.07
E3 PH	.19	.17	.05	-.04	.16	.10	.13	.23	.11	.15	.22	.21	-.04	.18	.43	-.09	-.03	.02	-.13	-.09	-.10	-.12
E3 EN	-.13	-.05	-.10	.06	-.03	-.04	-.09	-.19	-.16	-.10	-.14	-.14	-.05	-.08	-.12	.32	-.22	-.05	-.08	.29	.29	.21
E3 TE	.08	-.04	.05	.07	.12	.13	.10	.14	.10	.05	.19	.14	-.21	-.24	-.08	-.06	.64	.11	.16	-.17	-.14	-.18
E3 DY	.03	-.08	-.01	.16	-.04	-.09	.08	.06	.05	.00	.00	.00	-.33	-.26	-.04	.06	.15	.33	.35	.02	-.02	-.11
E3 RH	.02	-.12	-.09	.04	-.08	-.03	-.05	-.03	.00	-.08	-.07	-.08	-.41	-.29	-.04	.07	.09	.15	.65	-.07	.04	-.01
E3 HI	-.05	-.07	.03	.02	.13	-.03	-.16	-.18	-.07	-.03	-.06	-.05	-.23	-.10	-.07	.26	-.13	.02	-.05	.57	.26	.24
E3 FO	-.14	-.12	-.10	-.09	.06	-.08	-.10	-.18	-.10	-.17	-.10	-.14	-.32	-.11	-.06	.32	-.18	.07	.05	.33	.51	.23
E3 TH	.03	.02	-.07	.02	.06	-.07	-.07	-.10	.02	-.01	-.04	-.03	-.18	-.18	-.08	.15	-.13	.00	.02	.27	.25	.57
E4 TO	.11	.19	.07	.09	.16	.08	.11	.11	.01	.16	.16	.18	.16	.19	.11	-.03	-.09	-.05	-.18	-.03	.03	.08
E4 IN	.05	.12	.15	.11	.11	.18	.09	.04	-.07	.16	.13	.16	.09	.23	.09	-.08	-.10	-.07	-.22	-.03	.04	.05
E4 PH	.09	.16	.10	.29	.22	.05	.02	.10	.02	.20	.14	.19	-.10	.10	.22	-.03	-.03	-.07	-.17	.07	.12	.19
E4 EN	-.03	.05	.01	.23	.15	-.06	.10	.00	-.07	.06	.05	.06	-.06	-.07	.03	.09	.14	.01	-.07	-.07	.03	.01
E4 TE	-.03	.03	-.04	.24	.15	-.06	.11	.05	-.12	.04	.06	.05	-.05	.01	.01	.03	.17	.00	-.12	-.10	.03	.09
E4 DY	.05	.15	.14	.21	.13	.09	.12	.03	-.02	.18	.12	.17	-.16	.02	-.01	-.05	.00	.12	.05	.06	.12	.07
E4 RH	-.01	.09	.02	.09	.05	.01	.03	-.01	.03	.06	.04	.06	-.09	-.04	.09	-.09	-.04	-.02	.06	.14	.14	.13
E4 HI	.03	.11	.01	.22	.24	-.01	.00	-.03	.04	.11	.10	.12	.04	.05	-.09	.05	-.13	-.06	-.18	.29	.19	.22
E4 FO	.01	.06	-.02	.16	.14	-.06	-.04	-.01	-.02	.05	.02	.04	-.07	.07	-.07	.03	-.20	-.06	-.08	.18	.36	.24
E4 TH	.13	.04	.01	.18	.12	-.01	-.03	.06	.02	.10	.06	.08	-.11	.08	-.08	.07	-.13	-.10	-.10	.22	.24	.32

Outcome and Independent Variable Relationships
Box = ps.15, Shade = Negative Correlations

Independent Variable Relationships
Box = ps.30, Shade = Negative Correlations

Pearson Product Moment Correlation (Matrix)

	Q 2. % of time during BAND REHEARSALS										Q 3. % of time during PRIVATE LESSONS										Q 4. Student's Rating Importance in Dev. Musicianship									
	E2 TO	E2 IN	E2 PH	E2 EN	E2 TE	E2 DY	E2 RH	E2 HI	E2 FO	E2 TH	E3 TO	E3 IN	E3 PH	E3 EN	E3 TE	E3 DY	E3 RH	E3 HI	E3 FO	E3 TH	E4 TO	E4 IN	E4 PH	E4 EN	E4 TE	E4 DY	E4 RH	E4 HI	E4 FO	E4 TH
3ST1	-.08	.05	.12	.08	-.03	.02	-.03	-.04	-.08	-.06	-.10	.06	.19	-.13	.08	.03	.02	-.05	-.14	.03	.11	.05	.09	-.03	-.03	.05	-.01	.03	.01	.13
3ST2	.02	.15	.08	.05	-.11	-.12	-.04	.06	-.15	-.04	.06	.14	.17	-.05	-.04	-.08	-.12	-.07	-.12	.02	.19	.12	.16	.05	.03	.15	.09	.11	.06	.04
3ST3	.02	.16	.10	.02	-.14	-.01	-.01	-.08	-.08	-.15	-.02	.22	.05	-.10	.05	-.01	-.09	.03	-.10	-.07	.07	.15	.10	.01	-.04	.14	.02	.01	-.02	.01
3ST4	-.02	.06	.17	-.03	.09	-.19	-.09	.11	-.02	.00	-.10	-.01	-.04	.06	.07	.16	.04	.02	-.09	.02	.09	.11	.29	.23	.24	.21	.09	.22	.16	.18
4ST1	-.10	.10	.12	.04	.10	-.23	-.06	.09	-.01	.02	-.10	-.08	.16	-.03	.12	-.04	-.08	.13	.06	.06	.16	.11	.22	.15	.15	.13	.05	.24	.14	.12
4ST2	-.15	.08	.08	.12	.04	.03	.03	-.09	-.15	-.19	-.08	.08	.10	-.04	.13	-.09	-.03	-.03	-.08	-.07	.08	.18	.05	-.06	-.06	.09	.01	-.01	-.06	-.01
4ST3	-.01	.06	.10	.00	-.01	.01	-.02	-.03	-.07	-.03	-.05	.03	.13	-.09	.10	.08	-.05	-.16	-.10	-.07	.11	.09	.02	.10	.11	.12	.03	.00	-.04	-.03
4ST4	-.10	.09	.10	.00	.08	.00	.04	-.14	-.11	-.04	-.06	.07	.23	-.19	.14	.06	-.03	-.18	-.16	-.10	.11	.04	.10	.00	.05	.03	-.01	-.03	-.01	.06
4ST5	-.10	.10	.04	.06	-.01	-.02	-.07	-.05	-.10	.01	-.01	-.06	.11	-.18	.10	.05	.00	-.07	-.10	.02	.01	-.07	.02	-.07	-.12	-.02	.03	.04	-.02	.02
MAT3	-.01	.17	.15	.05	-.10	-.09	-.05	-.01	-.13	-.11	-.04	.18	.15	-.10	.05	.00	-.08	-.03	-.17	-.01	.16	.16	.20	.06	.04	.18	.06	.11	.05	.10
MAT4	-.15	.14	.14	.07	.07	-.09	-.03	-.05	-.13	-.08	-.10	.00	.22	-.14	.19	.00	-.07	-.06	-.10	-.04	.16	.13	.14	.05	.06	.12	.04	.10	.02	.06
GT	-.10	.17	.16	.07	-.01	-.10	-.05	-.03	-.15	-.10	-.08	.09	.21	-.14	.14	.00	-.08	-.05	-.14	-.03	.18	.16	.19	.06	.05	.17	.06	.12	.04	.08
E1 TO	.41	.22	.09	-.05	-.11	-.17	-.17	-.14	-.22	-.13	.75	.10	-.04	-.05	-.21	-.35	-.41	-.23	-.32	-.18	.16	.09	-.10	-.06	-.05	-.16	-.09	.04	-.07	-.11
E1 IN	.14	.51	.03	.03	-.13	-.18	-.18	-.14	-.13	-.11	.10	.66	.18	-.08	-.24	-.26	-.29	-.10	-.11	-.18	.19	.23	.10	-.07	.01	.02	-.04	.05	.07	.08
E1 PH	-.13	.09	.34	.07	-.15	.05	-.02	-.11	-.13	-.10	-.09	.00	.43	-.12	-.08	-.04	-.04	-.07	-.06	-.08	.11	.09	.22	.03	.01	-.01	.09	-.09	-.07	-.08
E1 EN	-.08	-.12	-.10	-.04	.04	.02	.08	.22	.19	.11	-.19	-.17	-.09	.32	-.06	.06	.07	.26	.32	.15	-.03	-.08	-.03	.09	.03	-.05	-.09	.05	.03	.07
E1 TE	-.27	-.12	.02	.05	.26	.07	.09	-.06	-.19	-.17	-.20	-.15	-.03	-.22	.64	.15	.09	-.13	-.18	-.13	-.09	-.10	-.03	.14	.17	.00	-.04	-.13	-.20	-.13
E1 DY	-.14	-.11	-.02	-.02	.17	.20	.05	.05	.03	-.08	-.20	-.19	.02	-.05	.11	.33	.15	.02	.07	.00	-.05	-.07	-.07	.01	.00	.12	-.02	-.06	-.06	-.10
E1 RH	-.20	-.27	-.16	.08	.05	.25	.27	-.09	.07	-.08	-.40	-.21	-.13	-.08	.16	.35	.65	-.05	.05	.02	-.33	-.22	-.17	-.07	-.12	.05	.06	-.18	-.08	-.10
E1 HI	-.10	-.19	-.08	.04	-.09	-.08	-.06	.46	.36	.37	-.22	-.09	-.09	.29	-.17	.02	-.07	.57	.33	.27	-.03	-.03	.07	-.07	-.10	.06	.14	.29	.18	.22
E1 FO	-.06	-.14	-.05	-.08	-.07	.01	-.04	.24	.48	.42	-.21	-.11	-.10	.29	-.14	-.02	.04	.26	.51	.25	.03	.04	.12	.03	.03	.12	.14	.19	.36	.24
E1 TH	.00	-.05	-.12	-.04	-.17	-.15	-.06	.26	.28	.60	-.11	-.07	-.12	.21	-.18	-.11	-.01	.24	.23	.57	.08	.05	.19	.01	.09	.07	.13	.22	.24	.32
E2 TO	###	.17	-.15	-.32	-.06	-.27	-.16	-.18	-.07	-.08	.38	.18	-.11	.08	-.25	-.15	-.16	-.16	-.15	-.14	.19	.16	.03	.09	.05	.08	.01	.06	.09	.06
E2 IN	.17	###	.09	-.04	-.23	-.25	-.32	-.24	-.30	-.22	.28	.42	.09	-.11	-.15	-.28	-.29	-.15	-.16	-.10	.11	.19	.02	-.02	-.12	-.09	-.16	-.03	-.05	-.16
E2 PH	-.15	.09	###	-.07	-.18	.04	-.13	-.03	-.10	-.13	.10	.01	.18	-.16	.03	-.02	-.17	-.05	-.11	-.14	.05	.08	.11	.09	.02	.01	.05	-.01	-.04	-.09
E2 EN	.32	-.04	-.07	###	-.29	-.08	-.26	-.15	-.22	-.21	-.06	-.01	.16	-.04	.09	-.07	.01	-.03	-.07	-.12	-.12	.05	-.08	-.01	-.17	-.05	.00	.00	-.03	-.09
E2 TE	-.06	-.23	-.18	-.29	###	-.12	.17	-.10	-.01	-.07	-.10	-.12	-.01	-.03	.23	.24	.02	-.05	.02	-.12	.01	-.06	-.07	.13	.14	-.02	-.07	-.05	.03	.06
E2 DY	-.27	-.25	.04	-.08	-.12	###	.28	-.08	-.03	-.12	-.21	-.09	.00	-.10	.14	.26	.25	-.08	.00	-.06	-.09	.01	-.02	-.13	-.03	.03	.00	-.25	-.13	-.13
E2 RH	-.16	-.12	-.13	-.26	.17	.28	###	-.06	-.01	.00	-.22	-.18	-.08	-.04	.02	.20	.43	.04	.07	.05	.02	-.01	-.07	.04	.08	.01	.02	-.15	-.05	.02
E2 HI	-.18	-.24	-.03	-.15	-.10	-.08	-.06	###	.52	.60	-.18	-.13	-.13	.30	-.16	.07	-.06	.47	.26	.35	.10	-.06	.09	.08	.05	.08	.13	.26	.12	.18
E2 FO	-.07	-.10	-.10	-.22	-.01	-.03	-.01	.52	###	.51	-.18	-.18	-.15	.24	-.14	.08	.08	.30	.47	.25	-.03	-.02	.05	.05	.08	.12	.14	.22	.36	.21
E2 TH	-.08	-.22	-.13	-.21	-.07	-.12	.00	.60	.51	###	-.09	-.15	-.19	.22	-.18	.00	-.03	.28	.29	.53	.07	-.11	.12	.00	.04	.04	.15	.23	.20	.30
E3 TO	.38	.28	.10	-.06	-.10	-.21	-.22	-.18	-.18	-.09	###	.12	-.17	-.14	-.29	-.46	-.45	-.30	-.28	-.21	.12	.06	-.11	-.06	-.11	-.11	-.11	.03	-.01	-.08
E3 IN	.18	.42	.01	-.01	-.12	-.09	-.18	-.13	-.18	-.15	.12	###	.05	-.03	-.24	-.29	-.36	-.19	-.23	-.19	.16	.28	.00	-.03	.07	.00	-.10	-.05	-.01	.00
E3 PH	-.11	.09	.18	.16	-.01	.00	-.08	-.13	-.15	-.19	-.17	.05	###	-.19	-.06	-.04	-.13	-.15	-.17	-.24	.06	.07	.19	-.05	-.01	-.07	-.04	-.05	-.10	-.06
E3 EN	.08	-.11	-.16	-.04	-.03	-.10	-.04	.30	.24	.22	-.14	-.03	-.19	###	-.28	-.08	-.09	.30	.29	.22	.09	.09	.12	.13	.03	.13	.13	.14	.06
E3 TE	-.25	-.15	.03	.09	.23	.14	.02	-.16	-.14	-.18	-.29	-.24	-.06	-.28	###	.13	.10	-.17	-.24	-.23	-.26	-.20	-.06	-.01	.06	.00	.01	-.18	-.20	-.17
E3 DY	-.15	-.28	-.02	-.07	.24	.26	.20	.07	.08	.00	###	-.29	-.04	-.08	.13	###	.25	.07	.03	-.03	-.12	-.18	-.01	.08	-.01	.08	.00	-.01	-.02	.07
E3 RH	-.16	-.29	-.17	.01	.02	.25	.43	-.06	.08	-.03	###	###	-.13	-.09	.10	.25	###	-.07	.06	.04	-.16	-.10	.00	.05	-.01	.10	.17	-.15	-.08	-.09
E3 HI	-.16	-.15	-.05	-.03	-.05	-.08	.04	.47	.30	.28	###	-.19	-.15	.30	-.17	.07	-.07	###	.40	.41	-.08	-.09	-.02	.01	-.09	.03	.01	.28	.12	.18
E3 FO	-.15	-.16	-.11	-.07	.02	.00	.07	.26	.47	.29	-.28	-.23	-.17	.29	-.24	.03	.06	.40	###	.29	.01	.01	-.05	.06	-.05	.04	-.03	.05	.26	.14
E3 TH	-.14	-.10	-.14	-.12	-.12	-.06	.05	.35	.25	.53	-.21	-.19	-.24	.22	-.23	-.03	.04	.41	.29	###	.05	-.05	.13	-.03	.10	.07	.15	.23	.21	.33
E4 TO	.19	.11	.05	-.12	.01	-.09	.02	.10	-.03	.07	.12	.16	.06	.09	-.26	-.12	-.16	-.08	.01	.05	###	.60	.38	.29	.40	.31	.21	.15	.26	.27
E4 IN	.16	.19	.08	.05	-.06	.01	-.01	-.06	-.02	-.11	.06	.28	.07	.09	-.20	-.18	-.10	-.09	.01	-.05	.60	###	.34	.31	.33	.34	.28	.13	.29	.14
E4 PH	.03	.02	.11	-.08	-.07	-.02	-.07	.09	.05	.12	-.11	.00	.19	.12	-.06	-.01	.00	-.02	-.05	.13	.38	.34	###	.31	.53	.50	.53	.28	.37	.32
E4 EN	.09	-.02	.09	-.01	.13	-.13	.04	.08	.05	.00	-.06	-.03	-.05	.13	-.01	.08	.05	.01	.06	-.03	.29	.31	.31	###	.39	.39	.33	.33	.39	.28
E4 TE	.05	-.12	.02	-.17	.14	-.03	.08	.05	.08	.04	-.11	.07	-.01	.13	.06	-.01	-.01	-.09	-.05	.10	.40	.33	.53	.39	###	.45	.44	.27	.38	.37
E4 DY	.08	-.09	.01	-.05	-.02	.03	.01	.08	.12	.04	-.11	.00	-.07	.03	.00	.08	.10	.03	.04	.07	.31	.34	.50	.39	.45	###	.57	.27	.39	.34
E4 RH	.01	-.16	.05	.00	-.07	.00	.02	.13	.14	.15	-.11	-.10	-.04	.13	.01	.00	.17	.01	-.03	.15	.21	.28	.53	.33	.44	.57	###	.33	.37	.25
E4 HI	.06	-.03	-.01	.00	-.05	-.25	-.15	.26	.22	.23	.03	-.05	-.05	.13	-.18	-.01	-.15	.28	.05	.23	.15	.13	.28	.33	.27	.27	.33	###	.65	.66
E4 FO	.09	-.05	-.04	-.03	.03	-.13	-.05	.12	.36	.20	-.01	-.01	-.10	.14	-.20	-.02	-.08	.12	.26	.21	.26	.29	.37	.39	.38	.39	.37	.65	###	.68
E4 TH	.06	-.16	-.09	-.09	.06	-.13	.02	.18	.21	.30	-.08	.00	-.06	.06	-.17	.07	-.09	.18	.14	.33	.27	.14	.32	.28	.37	.34	.25	.66	.68	###

Independent Variable Relationships
Box = ps.30, Shade = Negative Correlations

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Simple Regression

p≤.05

	Code	Speciality Skill	Number	R	R^2	Adjusted R^2	Percentage of Influence	F-test	SLOPE	Probability
		Q 1. % of Time during INDIVIDUAL PRACTICING								
1	E1 TO	Tone	264	.01	.00	-.004	-0.4%	.01	.00	.931
2	E1 IN	Intonation	264	.12	.02	.011	1.1%	4.01	.02	.046
3	E1 PH	Phrasing	264	.05	.00	-.001	-0.1%	.78	.01	.378
4	E1 EN	Ensemble	264	.18	.03	.027	2.7%	8.31	-.03	.004
5	E1 TE	Technique	264	.10	.01	.006	0.6%	2.71	.01	.101
6	E1 DY	Dynamics	263	.00	.00	-.004	-0.4%	.00	.00	.984
7	E1 RH	Rhythm	263	.07	.01	.001	0.1%	1.34	-.01	.249
8	E1 HI	History	262	.09	.01	.004	0.4%	2.06	.03	.152
9	E1 FO	Form	263	.13	.02	.013	1.3%	4.35	-.02	.038
10	E1 TH	Theory	263	.06	.00	-.001	-0.1%	.85	.01	.359
		Q 2. % of Time during BAND REHEARSALS								
1	E2 TO	Tone	259	.10	.01	.005	0.5%	2.35	-.009	.127
2	E2 IN	Intonation	260	.14	.02	.014	1.4%	4.78	.014	.030
3	E2 PH	Phrasing	260	.17	.03	.026	2.6%	7.86	.026	.005
4	E2 EN	Ensemble	260	.04	.00	-.002	-0.2%	.47	.003	.493
5	E2 TE	Technique	260	.02	.00	-.003	-0.3%	.10	-.002	.747
6	E2 DY	Dynamics	260	.07	.01	.001	0.1%	1.21	-.010	.273
7	E2 RH	Rhythm	260	.05	.00	-.001	-0.1%	.75	-.006	.387
8	E2 HI	History	260	.01	.00	-.004	-0.4%	.04	.003	.846
9	E2 FO	Form	260	.13	.02	.012	1.2%	4.22	-.027	.041
10	E2 TH	Theory	260	.07	.01	.002	0.2%	1.41	-.018	.237
		Q 3. % of Time during PRIVATE LESSONS								
1	E3 TO	Tone	253	.07	.01	.002	0.2%	1.39	-.005	.240
2	E3 IN	Intonation	253	.11	.01	.007	0.7%	2.90	.012	.090
3	E3 PH	Phrasing	253	.18	.03	.029	2.9%	8.41	.020	.004
4	E3 EN	Ensemble	252	.06	.00	-.001	-0.1%	.77	-.011	.382
5	E3 TE	Technique	254	.14	.02	.015	1.5%	4.76	.013	.030
6	E3 DY	Dynamics	251	.03	.00	-.003	-0.3%	.22	.004	.637
7	E3 RH	Rhythm	253	.11	.01	.008	0.8%	2.98	-.012	.086
8	E3 HI	History	253	.03	.00	-.003	-0.3%	.21	-.007	.645
9	E3 FO	Form	253	.12	.01	.010	1.0%	3.55	-.023	.061
10	E3 TH	Theory	253	.02	.00	-.003	-0.3%	.12	-.004	.726
		Q 4. Student's Rating--Importance in Developing Musicianship								
1	E4 TO	Tone	259	.20	.04	.036	3.6%	10.77	.326	.001
2	E4 IN	Intonation	259	.17	.03	.026	2.6%	7.87	.211	.005
3	E4 PH	Phrasing	259	.20	.04	.034	3.4%	10.13	.296	.002
4	E4 EN	Ensemble	259	.06	.00	.000	0.0%	1.02	.072	.314
5	E4 TE	Technique	259	.05	.00	-.002	-0.2%	.59	.065	.445
6	E4 DY	Dynamics	259	.17	.03	.025	2.5%	7.68	.234	.006
7	E4 RH	Rhythm	258	.06	.00	.000	0.0%	1.00	.086	.320
8	E4 HI	History	256	.11	.01	.008	0.8%	2.99	.087	.085
9	E4 FO	Form	254	.02	.00	-.003	-0.3%	.14	.019	.712
10	E4 TH	Theory	256	.08	.01	.002	0.2%	1.53	.063	.217

Shade = negative slope (trend-line); Box = significant at .05 level of significance

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Stepwise Regression

Forward (p≤.05)

R:	R^2	Adj. R^2	%
0.448	0.20	0.18	18%

Analysis of Variance Table

Source	DF:	Sum Squares:	Mean Square:	F-test:
REGRESSION	6	9312	1551.932	9.612
RESIDUAL	230	37134	161.453	
TOTAL	236	46446		

Variables in Equation

Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	F to Remove:
INTERCEPT	87.87			
E1 EN	-.47	.16	-.19	8.30
E1 HI	.93	.28	.21	11.25
E2 IN	.30	.10	.18	8.76
E3 PH	.36	.11	.20	11.31
E3 TE	.41	.10	.26	16.77
E4 TO	5.76	1.64	.22	12.30

Variables Not in Equation

	Variable	Par. Corr:	F to Enter:	Rank:
Practicing	1 E1 TO	-.02	.09	
	2 E1 IN	-.03	.25	
	3 E1 PH	-.07	1.19	
	4 E1 TE	.02	.07	
	5 E1 DY	-.04	.31	
	6 E1 RH	.06	.92	
	7 E1 FO	-.05	.50	
	8 E1 TH	.06	.73	
Band Rehearsal	9 E2 TO	-.09	1.94	5
	10 E2 PH	.11	2.56	3
	11 E2 EN	.04	.42	
	12 E2 TE	-.01	.01	
	13 E2 DY	-.05	.65	
	14 E2 RH	.06	.72	
	15 E2 HI	.00	.00	
	16 E2 FO	-.07	1.20	
	17 E2 TH	-.06	.80	
Private Lessons	18 E3 TO	-.05	.55	
	19 E3 IN	.02	.09	
	20 E3 EN	-.04	.31	
	21 E3 DY	.07	1.06	
	22 E3 RH	.04	.39	
	23 E3 HI	-.01	.01	
	24 E3 FO	-.03	.25	
Student Rating	25 E3 TH	.07	1.06	
	26 E4 IN	.04	.35	
	27 E4 PH	.07	1.25	6
	28 E4 EN	.06	.71	
	29 E4 TE	.00	.00	
	30 E4 DY	.13	3.93	1
	31 E4 RH	.00	.00	
	32 E4 HI	.11	2.67	2
	33 E4 FO	.03	.25	
	34 E4 TH	.09	2.01	4

Items that have some impact on MI (student outcome as measured by the study's GT score), but not a significant impact at p≤.05.

Appendix G

Exploratory
MULTIPLE REGRESSION

Count:	R:	R^2:	Adj. R^2	RMS Residual:
246	0.445	0.198	0.175	12.723

Analysis of Variance Table

Source	DF:	SS:	Mean Sq.	F-test:
REGRESSION	7	9528.02	1361.15	8.409
RESIDUAL	238	38524.07	161.87	p = .0001
TOTAL	245	48052.09		

Residual Information Table

SS[e(i)-e(i-1)]:	e ≥ 0:	e < 0:	DW test:
15117.723	128	118	0.392

Beta Coefficient Table

	Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:
	INTERCEPT	77.16				
1	E1 EN	-0.34	0.2	-0.13	2.24	0.026
2	E3 PH	0.37	0.1	0.20	3.46	0.001
3	E4 TO	5.02	1.7	0.19	2.93	0.004
4	E1 HI	0.92	0.3	0.21	3.37	0.001
5	E3 TE	0.39	0.1	0.25	4.00	0.000
6	E4 DY	2.97	1.4	0.13	2.15	0.033
7	E2 IN	0.32	0.1	0.19	3.13	0.002

Guttman's
PARTIAL CORRELATION

GT *0.308*

	Item	R	R^2
1	E3 TE	.18	3.10%
2	E3 PH	.18	3.06%
3	E1 EN	-.17	2.96%
4	E1 HI	.16	2.50%
5	E4 TO	.16	2.40%
6	E4 DY	.15	2.25%
7	E2 IN	.13	1.64%
8	E2 PH	.13	1.56%
9	E4 RH	-.10	1.06%
10	E4 HI	.10	1.06%
11	E2 TH	-.10	0.90%
12	E3 IN	.09	0.85%
13	E3 TH	.09	0.76%
14	E2 DY	-.09	0.74%
15	E1 PH	-.08	0.64%
16	E2 RH	.08	0.64%
17	E3 DY	.08	0.62%
18	E4 TE	-.08	0.62%
19	E2 TO	-.07	0.55%
20	E1 DY	-.07	0.53%

Items with an important impact on MI.

Items that do not have an important impact on MI.

	Item	R	R^2
21	E4 PH	.07	0.44%
22	E1 IN	-.06	0.41%
23	E3 FO	.06	0.32%
24	E1 TH	.06	0.30%
25	E3 RH	.05	0.29%
26	E3 HI	-.05	0.29%
27	E1 TE	-.05	0.25%
28	E4 FO	-.05	0.23%
29	E2 HI	.04	0.18%
30	E1 FO	-.04	0.15%
31	E3 EN	.04	0.14%
32	E2 FO	-.03	0.12%
33	E3 TO	.03	0.12%
34	E2 EN	.02	0.04%
35	E4 TH	.02	0.03%
36	E4 IN	.01	0.02%
37	E2 TE	.01	0.01%
38	E4 EN	-.01	0.01%
39	E1 TO	.01	0.00%
40	E1 RH	.00	0.00%

Shade = Negative correlation (slope)

Type III Sum of Squares

Model Coefficients

		MAT3 Subtests								MAT4 Subtests									TESTS					
		MAT3 ST1 Tonal Memory		MAT3 ST2 Melody Recog.		MAT3 ST3 Pitch Recognition		MAT3 ST4 Instrument Recog.		MAT4 ST1 Musical Style		MAT4 ST2 Auditory-Visual Recog.		MAT4 ST3 Chord Recognition		MAT4 ST4 Chord Recognition		MAT4 ST5 Cadence Recog.		Total	MAT3		MAT4		GT	
		t	p	t	p	t	p	t	p	t	p	t	p	t	p	t	p	t	p		t	p	t	p	t	p
	Practicing																									
E1 TO	Tone	-1.60	.11	1.18	.24	.01	.99	-.12	.90	.72	.47	.08	.94	-.11	.91	-.92	.36	1.89	.06	.5	-.06	.96	.55	.59	.31	.76
E1 IN	Intonation	-.37	.71	2.09	.04	1.30	.20	.62	.53	1.05	.30	1.52	.13	-.56	.58	1.10	.27	2.66	.01	2.0	1.47	.14	1.71	.09	1.78	.08
E1 PH	Phrasing	.33	.74	1.12	.26	.69	.49	.13	.90	1.20	.23	.31	.76	.21	.84	.67	.50	.55	.59		.92	.36	.95	.34	1.04	.30
E1 EN	Ensemble	-.91	.36	-.61	.54	-1.34	.18	-.13	.90	-.94	.35		.01		.02	-.83	.41	-.33	.75	-2.0	-1.19	.24		.02		.04
E1 TE	Technique	-.73	.47	1.37	.17	.29	.77	2.26	.02	3.23	.00	.96	.34	-.03	.98	.50	.61	2.47	.01	2.0	.95	.35	2.38	.02	1.94	.05
E1 DY	Dynamics	-1.03	.30	.37	.71	.27	.79	.95	.34	.80	.43	.52	.60	.24	.81	-.35	.73	2.51	.01	1.0	.13	.89	1.13	.26	.76	.45
E1 RH	Rhythm	-.82	.41	.58	.56	.52	.61	-.07	.95	-.35	.73	.57	.57	-.62	.54	-.20	.85	1.71	.09		.19	.85	.25	.80	.25	.80
E1 HI	History	.37	.71	1.66	.10	1.67	.10	1.43	.15	4.17	.00	.83	.41	-.31	.75	-.53	.60	2.21	.03	3.0	1.87	.06	2.32	.02	2.36	.02
E1 FO	Form		.02	-1.57	.12		.08	-1.42	.16	-.54	.59	-.61	.54	-.74	.46	-1.09	.28	-.16	.87	-1.5		.01	-.96	.34		.07
E1 TH	Theory	1.10	.27	2.59	.01	.85	.40	1.61	.11	1.67	.10	.79	.43	.81	.42	.83	.41	1.82	.07	1.5	2.18	.03	1.85	.07	2.22	.03
	Band Rehearsal																									
E2 TO	Tone	-.15	.88	-.28	.78	-.27	.79	-.64	.52	-1.40	.16	-1.59	.11	.04	.97	-1.39	.17		.07	-.5	-.42	.67	-1.91	.06	-1.40	.16
E2 IN	Intonation	.75	.46	.60	.55	1.09	.28	-.16	.87	.83	.41	1.10	.27	.72	.47	1.19	.24	.52	.60		.97	.33	1.36	.18	1.33	.18
E2 PH	Phrasing	1.86	.06	.77	.44	.81	.42	2.83	.01	1.79	.08	.56	.58	1.35	.18	1.46	.15	.00	1.00	2.0	1.89	.06	1.69	.09	1.99	.05
E2 EN	Ensemble	1.09	.28	-.50	.61	-.64	.52	-.73	.47	-.02	.98	.58	.57	-.06	.95	.02	.98	-.18	.86		-.29	.77	.14	.89	-.05	.96
E2 TE	Technique	.33	.74		.08		.07	1.12	.27	1.30	.20	.86	.39	.25	.81	1.07	.28	-.10	.92	-1.0	-1.26	.21	1.14	.26	.10	.92
E2 DY	Dynamics	.55	.58	-1.61	.11	-.25	.81		.02		.01	.17	.87	.62	.54	-.04	.97	-.07	.94	-2.0	-1.08	.28	-.82	.41	-1.04	.30
E2 RH	Rhythm	-.16	.87	.28	.78	.39	.70	-.70	.48	-.21	.83	.52	.61	-.17	.87	.44	.66	-1.14	.26		.10	.92	-.15	.88	-.04	.97
E2 HI	History	.20	.84	2.17	.03	.54	.59	1.33	.19	1.82	.07	1.19	.23	.69	.49		.04	-.84	.40	? 2.5	1.51	.13	.74	.46	1.20	.23
E2 FO	Form	-.06	.96		.05	-.25	.81	-.71	.48	-.79	.43	-.86	.39	-1.14	.26	-.20	.84		.10	-1.5	-1.29	.20	-1.45	.15	-1.54	.13
E2 TH	Theory	.01	.99	-.73	.46		.06	-.58	.57	-.23	.82		.04	.51	.61	1.18	.24	1.20	.23	-1.5	-1.29	.20	-.10	.92	-.70	.49

Box/Light Shaded=p≤.05; Box/non-shaded = p≤.10; Dark Shaded = Significant at either .05 to .10 level plus a "negative" Beta score form Model Coefficient

The Type III sums of squares statistic was ". . . designed to remove the effect of all the other effects in the model before testing the effect in question. Consequently, they can be thought of as being constructed from a sequential model where each effect in turn plays the role of the last effect being entered into the model. Because of this, observed cell frequencies do not play a part in forming the hypotheses being tested". (Abacus Concepts, Inc. SuperANOVA, p. 192).

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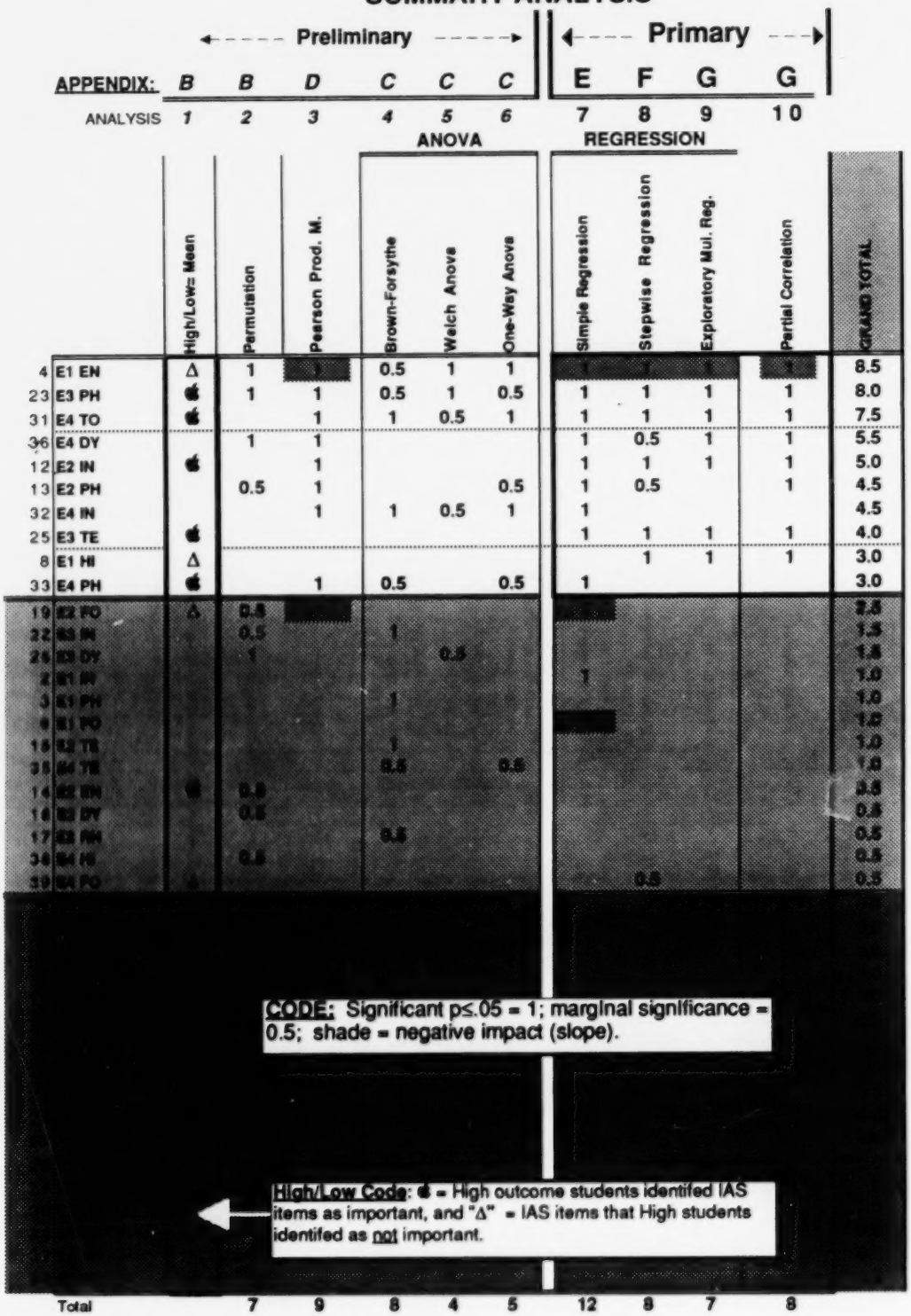
p. 2 of Appendix H [#E]

		MAT3 ST1 Tonal Memory		MAT3 ST2 Melody Recog.		MAT3 ST3 Pitch Recognition		MAT3 ST4 Instrument Recog.		MAT4 ST1 Musical Style		MAT4 ST2 Auditory-Visual Recog.		MAT4 ST3 Chord Recognition		MAT4 ST4 Chord Recognition		MAT4 ST5 Cadence Recog.		Total	MAT3		MAT4		GT	
	Private Lessons	t	p	t	p	t	p	t	p	t	p	t	p	t	p	t	p	t	p		t	p	t	p	t	p
E3 TO	**Tone**	.23	.82	.92	.36	.49	.62	-.08	.94	.23	.82		.09	-1.20	.23	.10	.92	.46	.64	-.5	.68	.50	-.75	.45	-.12	.90
E3 IN	**Intonation**	1.36	.18	1.41	.16	2.54	.01	.42	.68	-.20	.84	-.31	.76	-.65	.52	1.03	.31	-.04	.97	1.0	2.30	.02	-.18	.86	1.04	.30
E3 PH	**Phrasing**	1.93	.05	2.11	.04	.80	.42	-.18	.86	2.20	.03	-.38	.70	.16	.87	1.95	.05	1.12	.26	4.0	1.89	.06	1.59	.11	1.92	.06
E3 EN	**Ensemble**	.01	1.0	1.10	.27	.09	.93	1.30	.19	.48	.63	-.67	.51	-.37	.71	-.34	.74	-.96	.34		.78	.44	-.48	.63	.09	.93
E3 TE	**Technique**	.91	.36	.94	.35	1.34	.18	.50	.62	1.70	.09	-.09	.93	-.06	.95	1.21	.23	.77	.44	.5	1.42	.16	1.15	.25	1.42	.16
E3 DY	**Dynamics**	.75	.45	.38	.70	.93	.35	1.58	.12	-.15	.88		.06	.28	.78	.93	.35	1.16	.25	.5	1.16	.25	-.16	.88	.48	.63
E3 RH	**Rhythm**	1.03	.30	.22	.83	.21	.83	.16	.88	-.82	.41	-1.42	.16		.07	.22	.83	-.03	.98	-.5	.57	.57	-1.41	.16	-.58	.56
E3 HI	**History**	.15	.88	-.11	.91	1.54	.12	.40	.69	1.60	.11	-.17	.86		.03	-1.32	.19	-.59	.56	-1.0	.79	.43	-.53	.60	.07	.94
E3 FO	**Form**	-.78	.44	-.47	.64	-.21	.84	-1.41	.16	.74	.46	-1.35	.18	-.86	.39	-.36	.72	-.36	.72		-.84	.40	-.62	.54	-.80	.42
E3 TH	**Theory**	1.77	.08	1.97	.05	.33	.74	.50	.62	1.21	.23	-1.11	.27	.14	.89	.96	.34	1.52	.13	1.0	1.69	.09	.77	.44	1.32	.19
	Student's Rating																									
E4 TO	**Tone**	.67	.51	2.21	.03	-.45	.65	-1.16	.25	1.29	.20	-.09	.93	.99	.32	.95	.34	1.28	.20	1.0	.75	.45	1.38	.17	1.24	.22
E4 IN	**Intonation**	.20	.84	-.17	.87	2.24	.03	.47	.64	-.09	.93	3.11	.00	.28	.78	-.21	.84	-.95	.35	2.0	1.11	.27	.85	.40	1.09	.28
E4 PH	**Phrasing**	1.25	.21	1.49	.14	1.33	.18	2.96	.00	2.53	.01	.69	.49	-.42	.68	1.08	.28	1.02	.31	2.0	2.27	.02	1.70	.09	2.20	.03
E4 EN	**Ensemble**	-.74	.46	-.80	.42	-.54	.59	1.66	.10	.48	.64	-1.36	.18	.83	.41	-.25	.80	-.60	.55	.5	-.52	.60	-.23	.82	-.41	.68
E4 TE	**Technique**	-1.21	.23	-1.42	.16	-1.60	.11	1.57	.12	.12	.90		.01	.72	.47	.01	.99	-2.21	.03	-1.0	-1.46	.15	-.90	.37	-1.29	.20
E4 DY	**Dynamics**	.39	.70	1.68	.09	2.28	.02	.77	.44	.48	.63	1.53	.13	2.25	.03	-.31	.76	-.09	.93	2.0	2.06	.04	1.34	.18	1.87	.06
E4 RH	**Rhythm**	-.85	.40	-.50	.62	-1.35	.18		.04	-1.31	.19	-.59	.55	-1.09	.28	-.12	.90	.35	.73	-1.0	-1.54	.13	-1.04	.30	-1.41	.16
E4 HI	**History**	-.73	.46	2.10	.04	.67	.50	2.52	.01	3.66	.00	.74	.46	.88	.38	-.97	.33	.56	.57	3.0	1.47	.14	2.00	.05	1.99	.05
E4 FO	**Form**	-.79	.43	-.47	.64	-1.38	.17	-1.40	.16	-1.15	.25		.08	-1.54	.12	-.75	.45	-.37	.71	-.5	-1.39	.17	-1.86	.06		.06
E4 TH	**Theory**	2.09	.04	-1.36	.17	.23	.82	-.31	.76	-1.30	.19	.68	.50	-.68	.50	1.33	.18	.45	.65	1.0	.17	.86	-.09	.93	.03	.98

Box/Light Shaded=p≤.05; Box/non-shaded = p≤.10; Dark Shaded = Significant at either .05 to .10 level plus a "negative" Beta score form Model Coefficient

The Type III sums of squares statistic was ". . . designed to remove the effect of all the other effects in the model before testing the effect in question. Consequently, they can be thought of as being constructed from a sequential model where each effect in turn plays the role of the last effect being entered into the model. Because of this, observed cell frequencies do not play a part in formming the hypotheses being tested". (Abacus Concepts, Inc. SuperANOVA, p. 192).

SUMMARY ANALYSIS


Preliminary
Primary
APPENDIX: B B D C C C E F G G
ANALYSIS 1 2 3 4 5 6 7 8 9 10
ANOVA
REGRESSION
High/Low= Mean
Permutation
Pearson Prod. M.
Brown-Forsythe
Welch Anova
One-Way Anova
Simple Regression
Stepwise Regression
Exploratory Mul. Reg.
Partial Correlation
GRAND TOTAL
4 E1 EN Δ 1 0.5 1 1 8.5
23 E3 PH 1 1 0.5 1 0.5 1 1 1 1 8.0
31 E4 TO 1 1 0.5 1 1 1 1 7.5
36 E4 DY 1 1 1 0.5 1 1 5.5
12 E2 IN 1 1 1 1 5.0
13 E2 PH 0.5 1 0.5 1 0.5 1 4.5
32 E4 IN 1 1 0.5 1 4.5
25 E3 TE 1 1 1 1 4.0
8 E1 HI Δ 1 1 1 3.0
33 E4 PH 1 0.5 0.5 1 3.0
19 E2 PO Δ 0.5
22 E3 IN 0.5 1
26 E3 DY 1 0.5
2 E1 IN 1
3 E1 PH 1
9 E1 PO
18 E2 TE 1
35 E4 TE 0.5 0.5
14 E2 EN 0.5
16 E3 DY 0.5
17 E3 PH 0.5
34 E4 HI 0.5
39 E4 PO Δ 0.5
Total 7 9 8 4 5 12 8 7 8
EFFICACIOUS Impact on MI.
MARGINAL Impact on MI
NEGLIGIBLE Impact on MI.
CODE: Significant p≤.05 = 1; marginal significance = 0.5; shade = negative impact (slope).
High/Low Code: = High outcome students identifed IAS items as important, and "Δ" = IAS items that High students identifed as not important.

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